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DIESEL RAILWAY TRACTION

The September issue of this RAILWAY GAZETTE *Publication, illustrating and describing developments in Diesel Railway Traction, will be ready on September 1, price 2s.*

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THE RAILWAY GAZETTE
33, TOTHILL STREET, WESTMINSTER, S.W.1.

American Loan Withdrawals Suspended

IF the dollar situation previously had seemed to the ordinary man to be a matter of high finance rather than personal concern, its effect on the daily lives of all in this country was brought home with dramatic effect by the Chancellor of the Exchequer's broadcast on August 20. Mr. Dalton spoke with a gravity which was all the more impressive in contrast with some spritely utterances of his in the past, and avoided controversial statements, apart from a suggestion that Press comments after the economic debate in Parliament had increased the drain on dollars. Coming a few hours after Mr. Morrison's statement to his Press conference that the crisis was getting graver, with imports in July reaching the highest level ever recorded, counteracting the highest exports since 1920, Mr. Dalton's speech was the climax of a day during which the least sensitive must have been made increasingly aware of the difficulties ahead. Mr. Dalton's announcement of the suspension of many of the arrangements for converting dollars into sterling followed the paying out on Monday and Tuesday alone of last week of $66 million under the convertibility terms of the loan agreement. As a result of the suspension of sterling conversions into dollars, the $400 million of the American loan still remaining have been blocked, and, pending further negotiations, will not be available to the Government. The day on which Britain must depend unaided on her own efforts and resources thus has arrived even more swiftly than had been estimated from watching the rapidly dwindling American credit.

* * * *

Power Prospects for the Winter

Plans for adjusting the demands of industry for electric power this winter to the capacity of the supply undertakings were announced at a Press Conference held by Sir Guy Nott Bower, Deputy Secretary to the Ministry of Fuel & Power, last Saturday. The Government is asking for a reduction of 33⅓ per cent. in the peak demands of industrial users, but it was made clear that even if this reduction is achieved there will be a danger of load-shedding at certain periods. Several undertakings have evolved a rota scheme by means of which, if load shedding is necessary, it can be confined to individual concerns on particular days of the week. This proposal, which has been approved by the Ministry of Fuel & Power and by the Electricity Commissioners, should relieve much of the uncertainty and disruption of production plans which was experienced during the fuel crisis last winter. Advance instructions to reduce loads to a target figure will be given, as far as possible, the evening before cuts are likely. Regarding the coal position, Sir John Kennedy, Acting Chairman of the Electricity Commission, has stated that they were not afraid of the coal position this winter, by which he meant that the country was not in the same position as that in which it found itself early this year.

* * * *

Lower Iron and Steel Production

Production of steel ingots and castings was at an annual rate of 11,007,000 tons in July, as compared with 13,206,000 tons in June, and with 11,759,000 in July last year. The decline in output arose because of the limiting factor of coal supplies, and also because production was affected to an even greater extent than normal by the annual holiday arrangements, which this year tended to fall more than usual in July. Further, the new arrangement for six days additional holiday with pay to some extent has increased the length of the holiday period this year. Total steel production for the first seven months of the year to the week ended August 2, was 7,040,000 tons. To achieve the Government's target of 12½ million tons for 1947, production will have to be stepped up for the rest of this year to an annual rate of 13½ million tons.

* * * *

Railway Rolling Stock Output

Production of railway rolling stock, both in total and for overseas markets, showed an increase in May as compared with the earlier months of the year. According to the *Monthly Digest of Statistics*, issued by the Central Statistical Office, 60 main-line locomotives were produced in May, which compares with 47 in April, and only 39 in March, when the industry was affected by the fuel crisis. Of these 60 locomotives, 18 were

for export, compared with 10 in April, and 12 in March. For the whole of 1946 production was 726 main-line locomotives, of which 358 were for overseas buyers. For 1945 the total was 786, of which only 139 went overseas. Railway coaches produced in May numbered 132, compared with 110 in April, and 125 in March, and of these 17 went overseas, compared with 7 in April, and 11 in March. The total output for 1946 is given as 838, of which 15 were for export. This aggregate figure was double that for 1945, when it was 418, and when no shipments are recorded.

* * * *

Increased Output of Wagons

The output of wagons in June, after a temporary set-back in April, when it was 2,089, which included 286 for export markets, rose to 2,777, of which 353 were destined for export. In March the total production of wagons was 2,972, but vehicles earmarked for export were only 255. This rate of output of wagons is less than it was during the final quarter of last year, when output in each month exceeded 3,000 units, and, indeed, in November was as high as 3,977, when 612 wagons were exported. For the whole of last year, the total output of wagons was 39,354, and of these 11,389 were built for overseas customers. The highest point reached recently in the output of wagons was in March last year, when the production of the industry was no less than 4,213 units. A high level of 1,926 wagons for export was also attained during that month. In 1945 the production of wagons was 27,751, but no exports are shown in the *Statistical Digest*.

* * * *

Home Railway Traffic Receipts

The decline in receipts of the four main-line railways and London Transport which was recorded in the four weeks to July 13, continued in the period ended August 19. Coal and coke traffics, which in the preceding month were the one exception to the general decrease, are now lower by £1,000 in comparison with the previous year. The total decrease in all traffics of £1,750,000 for the four weeks compares with £1,062,000 in the previous month. A heavier decline has been shown in passenger traffic, the latest decrease of £980,000 comparing with one of 782,000 in the four weeks ended July 13:—

FOUR WEEKS ENDED AUGUST 10, 1947

	1947 £000	1946 £000	+ or − £000	Per cent. + or −
Passenger	19,754	20,734	−980	−4·7
Merchandise	6,632	7,401	−769	−10·4
Coal and coke	3,395	3,396	− 1	−0·03
Total	29,781	31,531	−1,750	−5·6

AGGREGATE FOR 32 WEEKS OF THE YEAR

	1947 £000	1946 £000	+ or − £000	Per cent. + or −
Passenger	117,842	125,013	−7,171	−5·7
Merchandise	54,986	63,996	−9,010	−14·1
Coal and coke	32,368	29,698	+2,670	+ 9·0
Total	205,196	218,707	−13,511	− 6·2

It would appear from the latest passenger takings that appeals to take holidays outside the mid-July to mid-August period are having their effect, the extent of which it may be possible to gauge when the returns for the current four weeks are published.

* * * *

Argentine Railways Sale Prospects

The terms of sale of the British-owned railways in Argentina were approved by the Courts on August 21, as reported on another page this week. Mr. Dalton's announcement the previous day of the inconvertibility of sterling has raised the question of how the payment of £150 million will be made, since Argentina's sterling balances in this country are insufficient to cover the whole price. Argentina at present is experiencing a shortage both of dollars and sterling. Since sterling acquired in the course of transactions with this country is no longer convertible into dollars, it may well be that the use to complete the purchase of sterling earned in this way will recommend itself to the Argentine authorities. The British market is still valuable to Argentine exporters, and transactions will be facilitated by the setting up last week of the Argentine Railways Purchasing Agency, the objects of which are described elsewhere in this issue. A serious setback in the completion of the sale is not foreseen, since General Peron, the President of Argentina, implied in a broadcast on Saturday that his country would ratify the purchase of the British-owned railways.

Indian Railway Officers

In connection with this subject, dealt with in previous editorials in our issues of May 9, July 25, and August 15, we have now been informed that a new association has been formed to protect the interests of, *inter alia*, European retired and serving officers of the former Indian Government Railways, including those previously employed on company-worked lines. It is known as the "Indian Government Officers (Retired) Association," and brief details of its aims will be found on page 246 in this issue. Its representative executive is a committee of nine, of whom two are retired Government Railways officers. There are more than 1,300 retired members of the services—including State Railways, Public Works Department, Forests, and Educational—whose interests are affected vitally by the present changes in India, but at the moment fewer than one-third have yet learnt of and become members of the association. Any of our readers who are eligible should join forthwith in their own interests, and the association should be of material assistance to the cause of the railway officers serving under contract with the Governor-General in Council.

* * * *

Rail-Guided Vehicles on Concrete Track

Efforts are being made in different parts of the world to evolve a form of transport suitable for opening up the wide open spaces and country districts where financial justification for light or other railways, or for roads, is impossible. One apparently successful attempt to solve this problem is being made in India, as recorded on page 237 in this issue. The system, known as Guideways, has some advantages over the normal railway, in that both prime and maintenance costs are only small fractions of those involved even in a light railway, and also because the rolling stock can be used on roads, making door-to-door transport feasible without break of bulk. Low initial outlay is assured by formation widths of 7 ft. for earthworks and 4 ft. for bridges and viaducts; by no sleepers being required, and only a single second-hand light rail bedded on a continuous slab of lime concrete 3-ft. wide; and by the use of light rolling stock. Virtually no maintenance is necessary, as there are no levelling, straightening, packing, or dressing of track, nor sleeper or rail renewals. Compared with the high upkeep costs of a road, those of the Guideways track are said to be much lower.

* * * *

Liquid Springs

The performance of liquid springs has so far been a somewhat specialised study, partly owing to its comparatively recent development into a practical and reliable method of suspension shock absorption. The idea of using liquid compression has long attracted engineers, however, for, owing to their immunity from fatigue, liquids provide the perfect springing medium. They remain unimpaired after long service, whereas metal springs deteriorate and sometimes even fracture in use. These advantages have been realised already in certain applications to aircraft, and might well be considered in regard to railway vehicles. The first investigator to obtain good numerical results in research work on the compressibility of fluids was Amagat, whose paper on this subject was published in France in 1893. He was followed by Bridgman, of Harvard University, U.S.A., whose work may be regarded as the starting point of the present development, and by Sir Charles Parsons and Stanley S. Cook in this country, who experimented with a cylinder of 4 in. bore and 12 in. external diameter, loaded by a 2,000-ton hydraulic press, and published their results in the Proceedings of the Royal Society in 1911. The present adaptation of the compressibility of liquids to suspension and shock-absorption devices dates from 1938, when the important research, described elsewhere in this issue in an abstract of a paper by Mr. R. H. Bound, was begun by Mr. George Dowty, and later continued by his firm.

* * * *

The Block System in Switzerland

The recent serious head-on collision on the South-Eastern Railway, one of the privately-owned lines in Switzerland, by which 11 lives are now reported to have been lost, has been followed by statements to the effect that there was no "block

system" on the line. As stated in "The Railways of Switzerland," published by *The Railway Gazette* in connection with the recent International Railway Congress at Lucerne, in 1892 the authorities compelled the adoption of the space-interval principle, or block system, as it would be regarded in this country, on all passenger-carrying lines, the apparent contradiction arising from the fact that it is not the custom in Switzerland, as it is not in some other countries, to use the expression "block system" unless some special apparatus, interlocked to some extent with the fixed signals if provided, is used to give effect to the space interval. If reliance is placed on the exchange of telegraph or telephone messages, as was the case in this instance, some expression such as "telegraphic train reporting" is used to designate it. This custom has not infrequently created a wrong impression among British signal engineers and traffic officers, as it did after the Lagny accident in France in 1933, when Monsieur Dautry gave a statement to the Press.

* * * *

All-Welded Boilers on the C.P.R.

In our issue of March 3, 1946, we recorded briefly the delivery to the Canadian Pacific Railway of a locomotive having an all-welded boiler instead of one of standard riveted construction, and now we have received a detailed account of the method of construction, which is given elsewhere in this issue. A second locomotive has been equipped with a similarly welded boiler, and both engines are working between Montreal and Toronto, and Winnipeg and Regina. The appearance of these boilers is an important event, and in view of the high hopes placed in them, reports on their actual performance in service will be of great value when available. The Locomotive Boiler Code of the American Society of Mechanical Engineers has been followed in the welding procedure, and particular care was taken to ensure the maximum facilities for testing specimens from each seam; X-ray examination also was carried out before the various components underwent the stress-relieving heat treatment. These boilers make an interesting comparison with those used by Mr. Bulleid in his "Merchant Navy" and "West Country" 4-6-2s. The C.P.R. 4-6-2s have carbon-steel fireboxes with four arch tubes (instead of two syphons as in the "Merchant Navy" class); the barrel is in three rings (instead of two) and the firedoor opening is much larger. The U-shaped plate which has replaced the foundation ring in the "West Country" class is not incorporated in the C.P.R. welded boilers.

* * * *

New York City Transit System Compared with L.P.T.B.

IN June, 1940, the City of New York became owner and operator of the rapid transit railways within its boundaries and at the same date took over the trolley and bus lines running in the boroughs of Brooklyn and Queens. The New York City Transit System is the official name covering these transport facilities which have been built up gradually since the State Legislature passed the Rapid Transit Act in 1891. The agency chosen by the City for the management of its transit system is a Board of Transportation, consisting of three members. The Board's duties resemble the functions of the London Passenger Transport Board, but it reports to the Mayor of New York and not to the Minister in charge of a Government department.

In November, 1945, the Mayor happened to be that great public character, the Hon. F. H. La Guardia, and to him was addressed a report on the Board's work during the first five complete fiscal years of its existence, ended June 30, 1945. The report is packed with financial and operating statistics, reflecting the impact of war conditions on services that are vital to the daily life of New York. These statistics are presented in a style typical of American practice and give more detailed information than is revealed by the annual reports of the London Passenger Transport Board. It may be instructive to contrast the layout and equipment of the two undertakings and to draw some comparisons between the results achieved. In the paragraphs below the New York figures refer to the 12 months ended June 30, 1945, and the London figures are for the complete year 1946.

The New York City Transit System is essentially an urban concern, serving the four boroughs of Manhattan, The Bronx, Brooklyn, and Queens. The System covers two long narrow tracts of land, separated by the East River, and does not extend to wide outer-suburban boundaries like the limits of the London Passenger Transport area. The difference in geographical features accounts for the New York System being primarily a carrier by rapid transit lines, while the London Board is predominantly a carrier by bus, motor coach, tramway, and trolley-bus. In New York 80 per cent. of the passengers go by rail; in London only 13 per cent. travel by rail, though they create 26 per cent. of the total passenger miles because, on an average, a rail journey is longer than a bus trip.

The accompanying table compares the financial position, the structure and the operating results of the two undertakings.

	New York 1945	London 1946
Capital expenditure	$1,523,928,000	£153,543,000
Net revenue	Def. $42,365,000	£4,696,000
Route miles of railway	237	180
Railway vehicles	6,458	3,662
Railway stations	521	182
Route miles of road services ...	314	2,965
Road vehicles	1,688	9,687
Number of employees	36,200	93,800
Railway car miles	368,734,000	193,750,000
Road vehicle miles	47,746,000	385,175,000
Railway passengers	1,941,372,000	569,482,000
Road passengers	484,070,000	3,689,924,000

Capital expenditure in New York has been roughly twice the sum spent on London transport arrangements. The great bulk of the American money has been disbursed on rapid transit lines. The Board of Transportation believes than New York has the most comprehensive and efficient city transit system in the world, carrying people over longer distances more rapidly and safely, and at a lower rate of fare, than any other urban transport service. The Board does not explain why its passengers pay less than cost price for these exceptional facilities. During the Board's term of office the loss per passenger has increased from 1·245 cents in 1941 to 1·736 cents in 1945. Fares have not been raised sufficiently to offset mounting labour costs, which represented 57 per cent. of passenger revenue in 1941 and possibly as high a proportion as 72 per cent. in 1946 .

Apparently New York has not in force methods for reviewing fares comparable with the practice followed here. It will be recalled that last year the Railway Rates Tribunal, acting as a consultative committee, advised the Minister of Transport on the adjustment of charges required to equate the balance of the L.P.T.B. net revenue account for 1947 to the fixed annual sum payable by the Government under the control agreement. The Minister amended the Committee's proposals and issued an order bringing revised railway and road charges into operation on February 9, 1947. The present prospect is that a further revision of charges will be necessary at an early date, if the Board is to keep clear of a subsidy from the Treasury.

Such a contretemps would not worry the New York Board of Transportation. That body exercises budgetary control of expense of operation and maintenance. In February of each year, it prepares for the Mayor and the Comptroller of New York a forecast of the financial results for the next fiscal year, based on current budgetary expenses and estimates of future trends of revenue and working costs. Somewhat naively, the Board's report explains that the forecast is framed so that the City Tax Budget may include "a sufficient appropriation of funds to support and pay all obligations for interest and amortisation of City transit debt after making allowance for the prospective amount to be supplied from earnings of the New York City Transit System."

In plain English the New York Transit System does not pay its way. Neither do New Yorkers use their socialised communications more intensively than Londoners travel by their Transport Board's services. The average number of passengers using the New York Transit System, on a normal weekday, is over 7¼ million, equal approximately to the total population of the City. About 45 per cent. of the passengers for the day move between 7 and 9 a.m. and between 5 and 7 p.m. The busiest hour of all is 5 to 6 p.m., when no fewer than 845,000 persons have passed into the rapid transit stations. In London the year 1946 was marked by a rapid growth of traffic. The number of passengers starting journeys on L.P.T.B. services each day averaged 11,700,000 throughout the year, compared with 10,400,000 before the war. This increase of 13 per cent. is remarkable because the population of the Board's area at

the close of 1946 was still some 400,000 below the level of June, 1939. There are, however, more people living in the outer zones of the area and the mileage worked by country buses rose to 55 per cent. above the pre-war level.

In New York as well as in London, the second world war interrupted all new construction work. In addition to resuming work on unfinished contracts, when the war ended, the New York Transit System prepared plans for extensions of lines, new connections, and widening of platforms. These schemes were estimated in 1945 to cost from $74,000,000 to $83,000,000. An extra sum of $12,000,000 was required for improving power stations. At the same time the Board of Transportation contemplated the purchase of 835 new cars to increase the length of trains from 6 to 10 cars on some sections and to intensify services on other lines. Its report states that "a car with a high percentage of standee room, with a maximum number of door openings properly spaced, and with high acceleration and deceleration rates, is best adapted to the rapid and safe movement of large numbers of passengers."

The L.P.T.B. can claim that its modern vehicles conform to that specification and, as explained in our July 18 issue, it is now endeavouring to design a car which will handle in comfort longer distance suburban traffic as well as local in-town traffic. The L.P.T.B. can show too that it has been no less ambitious than its New York contemporaries to keep facilities abreast of public requirements. We have described in recent issues how the Board has pushed ahead with projects included in the 1935-40 new works programme which the war brought to a standstill. The eastern extension of the Central Line over the L.N.E.R. tracks has reached Leytonstone, and the western extension, over tracks constructed by the G.W.R., has been opened as far as Greenford. Further instalments of the works programme have been delayed mainly by the inadequate supply of suitable labour.

In the meantime the Railway (London Plan) Committee was busy formulating bold proposals for the development of all railway systems in London . These proposals were outlined in our May 10, 1946, issue and are estimated to cost £230 million. The L.P.T.B. considers that an additional sum of the order of £200 million may have to be spent on essential schemes of railway improvement in its area, spread over a long period. Wisely, its 1946 report states that the actual works which are likely to be carried out in the near future will depend "upon the proportion of the national resources which the Government, with its knowledge of all the competing demands throughout the country, decides should be allocated for the benefit of the transport of Londoners." Of expenditure on ways and communications in great cities, there is no end. So far London can pride itself on meeting the resultant costs fairly and squarely.

* * * *

German Experience with Pulverised Coal Firing

IT has been a tempting idea to engineers for many years, to make use of the large deposits of brown coal, and other similar grades of fuels, for steam raising in locomotive fireboxes; in Germany particularly, where such fuels are found in large quantities, the desire to produce a satisfactory substitute for black coal has been understandably more attractive than in most other countries. The matter is one of economics rather than any technical desirability, for the calorific value of brown coal is far below that of black coal, but the fuel is readily available and so, like Holden's successful method of disposing of the oil-gas waste at Stratford sixty years ago, the problem is worth attacking.

The experiments carried out in Germany, from 1923 onwards, are undoubtedly the most comprehensive and important ever undertaken in this field, and are well worthy of study. The work was first limited to attempts with stationary boilers, although of the locomotive type, but these gave disappointing results. The Germans then formed a research society (called Studiengesellschaft, but nicknamed "Stug") composed of representatives of the firms of Berliner Maschinenbau A.G., Borsig, Hanomag, Henschel, Krupp, Schwartzkopff, and the Lignite and Coal Syndicates, to explore the matter further. An independent attempt to solve the problem was also made this time by the Allgemeine Elektrizitäts Gesellschaft (A.E.G.), and by 1928 sufficient information had been gathered to justify the conversion of ten 2-10-0 locomotives, of classes "G12" and "G82" of the German State Railway, to burn pulverised brown coal. Early in 1929 a little technical information was released to the press in this country, and descriptions in general terms were published. The progress made during the five years of intensive research (1923-28) in Germany was such that it was possible to report early in 1929 that "the trial runs made so far with the engines fitted with 'Studiengesellschaft' type burners have given excellent results" (the results of the A.E.G. experiments, apparently, had not been released at that time).

The deterioration of international relations with Germany during the earlier years of the Hitler regime naturally was not conducive to the free interchange of information; and after these early reports there was very little information to be gleaned about the performance in service of these ten locomotives. Pulverised fuel firing, however, was being actively explored in Germany, for in 1937 the firm of Borsig was asked by the State Railway Administration to construct a locomotive to burn pulverised black coal; its acceptance by the Administration was subject to its fulfilling a certain guaranteed performance. This it failed to do, and in consequence was never accepted.

A great deal of light has been shed on these interesting developments, and on all the extremely valuable experience which was represented in them, by the recent publication of a report* issued by the British Intelligence Objectives Sub-Committee. This report, prepared by Mr. W. O. Galletly, assisted by Mr. W. H. Chapman, contains the results of a painstaking and methodical piecing-together of information collected from various German sources since 1945. We learn that there were two "Stug" systems in use; in one, known as the "combined drive," a single steam turbine drove both the blowers and the coal-dust feed screws, while in the other ("separate drive") system the feed screws were driven by a separate steam engine mounted on the front of the tender. In the A.E.G. system, a separate drive is arranged, but with a somewhat different disposition of the component parts. The report gives the experience of a number of years' service with both the Stug and the A.E.G. systems, and—most commendably—publishes dynamometer car test results on the pulverised-fuel 2-10-0s and of similar engines with ordinary firing which were running concurrently with them.

These ten 2-10-0s worked in the Halle district till 1938 when the six engines of the "G12" class were sent to Senftenberg, and so far as can be gathered, all ten engines were at work up to the year 1944 when lack of spare parts immobilised them. Generally, they seem to have been well liked by their crews. The power consumption of the auxiliaries was small (varying from 3·7 to 6·25 per cent.) and the compensation in the form of better control of combustion was considerable. The engines worked to the same loads and schedules as the ordinary 2-10-0s. Trouble was experienced with "birds-nesting" formation on the tube plate, but was much reduced by improving the design of the burners, and by providing steam tube-blowers. The best contribution to the solution of the problem came from the introduction of more than 50 per cent. of the furnace air from "secondary sources" (that is, above the fire instead of through the grate). It would seem, therefore, that progress in the use of pulverised brown coal, had made great strides in Germany during the late 1930s. Experience, too, had been gained in the special precautions needed for the bulk transport of pulverised fuel to locomotive running sheds, and in preventing the dangerous accidents which could occur through carelessness during refuelling.

Brown coal was also used as solid fuel in locomotives during the latter part of the war, and was also made into briquettes for the same purpose, but this was only regarded as an emergency measure due to fuel shortage, and would not have been practised in any other circumstances.

Much less encouraging was the German attempt to use black coal in pulverised form for locomotive fuel. This was an elaborate experimental idea of Borsig's for a high-speed streamlined locomotive, and in order to provide a good lookout for the crew the "back to front" system used on certain Italian and U.S.A. locomotives was adopted. Thus the engine normally ran cab first, trailing its tender, which was thus interposed between it and its train. The fatal decision to arrange

* "German Locomotive Experience with Pulverised Fuels and Lump Brown Coal." British Intelligence Objectives Sub-Committee. Published by H.M. Stationery Office. Price 12s. 6d.

the engine in this way proved to be the undoing of the system of firing, for the remoteness of the tender from the firedoor necessitated such long pipes to convey the fuel to the firebox, that mixing of the air with the coal dust was indifferent. There were several other troubles due to inherent defects of design, and in 1945 the engine was rebuilt as an ordinary grate-fired locomotive with the 4-6-4 wheel arrangement and the normal location of tender.

The machinery operating under State control on German railways in connection with such experiments is interesting. Private enterprise here bore the brunt of the development work; the Railway Administration merely commissioning the work and making the fulfilment of a certain standard of performance into a condition of acceptance. The responsibility placed on the private firm is very heavy in these circumstances, but it should be borne in mind that had the project been successful, and eventually widely adopted, the firm stood to reap very considerable benefits. It would be interesting to see whether, under State control of railways in this country, the private locomotive builder would be entrusted with important development work of the character and scope, for instance, of the German pulverised fuel experiments.

* * * *

Victorian Railways

RESTORATIONS of passenger train services during the year ended June 30, 1946, resulted in higher revenue from passenger and parcels traffic on the Victorian Railways. A falling-off in the volume of war traffic, however, reduced the revenue from goods services, and although railway working expenses were lower, the year ended with a deficit of £62,400, as compared with a surplus of £207,013 in the previous year. A reduction of £298,529 in total working expenses included a saving of £150,000 as a result of reduced mileage by goods trains. Among the increases in expenditure, the major item was £132,000 for salaries and wages awards. Passenger revenue on the railways amounted to £6,787,553, an increase of £197,766. The total revenue from traffic carried by passenger trains was £7,412,669, or £241,593 higher. Gross revenue from all sources (railways, electric tramways, and road services) totalled £14,768,322, a reduction of £584,171. The working expenses charged to railway revenue showed a reduction of £298,530 at £12,615,559, and the net revenue of £2,152,763 was £286,642 lower than in the preceding year. Some results for the two years are compared below:—

	1944–45 £	1945–46 £
Gross revenue :—		
Railways	15,258,317	14,675,049
Electric tramways	88,138	86,558
Road motor public services	6,038	6,715
Total	15,352,493	14,768,322
Working expenses :—		
Railways	12,835,545	12,577,513
Less charged to special funds :—		
Trust fund railway works (defence purposes) ...	1,127	—
Surplus revenue Act	2,113	—
Deferred maintenance reserve	—	46,388
	12,832,305	12,531,125
Electric tramways	64,093	65,753
Road motor public services	17,690	18,680
Working expenses charged to railway revenue	12,914,088	12,615,558
Net revenue	2,438,405	2,152,763
Interest charges and expenses (including loan conversion expenses)	1,902,592	1,902,029
Exchange on interest payments and redemption ...	200,026	184,876
Contribution to the National Debt sinking fund ...	128,773	128,259
Surplus (+) or deficit (−)	+207,013	−62,400

The report describes the difficulties occasioned by restricted coal supplies, which not only entailed losses of revenue, but also involved the administration in heavy additional costs for hauling more than half its total requirements overland from New South Wales. This inflated working costs to the extent of £184,000.

The shortage occasioned serious reductions in country passenger services, the heaviest cuts showing a reduction of 74 per cent. compared with 1941. Inter-State passengers suffered delays as a result of reduced services, and at times there was a waiting list for Western Australia sufficient to absorb the administration's accommodation for eight or ten weeks in advance. Suburban electric services were interfered with to a smaller extent, valuable assistance being given by the State Electricity Commission.

To combat the coal shortage, considerable quantities of firewood were used, but this is an unsatisfactory solution, apart from the low heating value of the fuel, since the danger of fire restricts the use of wood to a few months of the year. During part of the winter of 1945, approximately 7,000 tons of firewood a week were being consumed by locomotives. Although in normal circumstances oil would not be justified as a fuel for locomotives in Victoria, the exceptional situation led to the conversion of locomotives for burning oil, 12 being completed and running before the end of the financial year. More faith is placed, however, in the utilisation of brown coal for locomotives, as there are large and easily worked deposits of this fuel in the State.

During the year the wartime restrictions on commercial road transport were withdrawn, resulting in an immediate revival of active road competition. The position was aggravated by the diversion of traffic to road transport on the grounds that the rail services, restricted by the coal shortage, were insufficient. It is felt, however, that much of the competitive movement of goods by road arose from the fact that orders for materials in short supply were placed direct with the producer, in the hope of obtaining priority, rather than purchases being made through the usual channels. The increased number of applications for long-distance road service licences now before the Transport Regulation Board is regarded as constituting "a serious threat to future railway business."

The report refers to improved air services, and their attractions for Inter-State travel now that larger aircraft are used and frequency is increased. The administration considers that development in this form of transport should not be fostered by subsidies, and should be so controlled that it will not weaken railway service so long as the latter must be maintained for the vital transport needs of the general community.

* * * *

Ballast Cleaning

AT the 1946 convention of the Roadmasters' & Maintenance of Way Association at Chicago, Mr. H. W. Protzeller presented an address on the cause and cleaning of dirty ballast. He showed that, apart from considerations of safety and satisfactory road maintenance, ballast cleaning should be justifiable financially, especially where traffic is heavy and mechanical methods are adopted. His address records that careful measurement has revealed that, in average conditions, wave action set up in the track by moving loads is absorbed to the extent of only 10 per cent. by the rails and sleepers, the whole of the remaining 90 per cent. being absorbed by the ballast. Examining the case of track consisting of 131-lb. rails, 24 sleepers to a 39-ft. rail length, and (*a*) firmly packed stone and, alternatively, (*b*) cinder ballast, it has been found that stiffness of track (*a*) is four times that of (*b*). Also, assuming that a train of bogie vehicles moving over this track may be considered to cause one-and-a-half depressions in it for each vehicle, it is found that the depth of a full depression is 0·16 in. with stone-ballasted and 0·40 in. with soft track, when the average axle load is 40,000 lb. or, say, 18 English tons. Under these conditions the average total downward pressure on each sleeper is 16,000 lb. on hard firm ballast and 11,000 lb. on soft ballast.

It is further deduced that the wasted energy on the firm track is 107 foot-pounds per depression, whereas on the soft track it amounts to 183 foot-pounds. Moreover, a 100-car train, producing 150 depressions, depresses the track, if it has 3,250 sleepers per mile, 150 × 3,250 or 487,500 times in every mile travelled. If the cars have average axle loads of 40,000 lb., the address continues, the locomotive hauling them will have to exert additional horse-power amounting to 1,580 to overcome the resistance of the track where it is stone-ballasted, and 2,700 additional h.p. where it is on soft ballast and has only ¼ the stiffness. The train is, in fact, continuously ascending a steeper gradient in the latter case—even where the unloaded track is level—and the extra 1,120 h.p. of additional effort required to climb it has a considerable monetary value. Expenditure to this extent is, therefore, justified if a stiffer track can be assured, as it can be by using and maintaining stone ballast in a dry and clean condition.

The extent to which even the best stone ballast becomes "lubricated" and loses its resistance to sleeper thrust, once it is permeated by water and chipping dust, mixed to form a sludge or dirt, is well known, and the reasons for this permeation are next discussed in the address. The water causing this trouble is seldom surface or rain water, but is drawn up by capillary action from below formation level. It may be drawn up from considerable depths, and has been definitely proved to have risen in compacted embankments from levels over 50 ft. below formation. When it reaches the ballast it mixes with powdered ballast and other dirt to form a semi-liquid silt, which is further pumped up through the ballast by the wave action of the track.

Once the voids in the ballast are filled with silt and its load-carrying ability is decreased thereby, the magnitude of the track depressions is increased and the condition of the permanent way rapidly deteriorates. So long, however, as a proportion of the stone ballast is and can be kept clean and dry, the tendency of the capillary water is to move from the dirty into the clean ballast, carrying the silt with it. As the silt leaves the uncleaned ballast, the capillary action decreases throughout the road bed, and ballast cleaning has, therefore, a double effect. Rainfall actually tends to assist in cleaning dirty ballast and in further reducing capillary action. Once the sleeper beds have been drained, the ballast regains its elasticity, the pumping action of the sleepers is reduced. and the tendency for water to be drawn up from the subsoil is lessened.

Obviously, the whole of the ballast section cannot be cleaned conveniently under traffic, and it has been found that if the ballast shoulders and the "cribs," or ballast between the sleepers—together comprising under 40 per cent. of the total section—are cleaned, the work will be more than 60 per cent. effective for reasons explained above. In opening out the ballast preparatory to cleaning, care must be taken not to disturb the part under each sleeper and, in removing the shoulders and cribs, at least 1 in. or 1½ in. should be left intact against the sleeper and the excavation sloped off thence at 1 to 1. Mr. Protzeller specially warns permanent way staff against scooping 3 in. or 4 in. of ballast from under the ends of sleepers to remove the mud which tends to collect there to form compact dams round and under the sleeper-ends. He claims that good ballast cleaning with modern plant will remove 85 to 90 per cent. of the dirt, and he states that as many as 3,200 American (short) tons of foul ballast can be removed from a mile of single track. During 1945 one American eastern trunk line spent $250,000 (£62,500) on ballast cleaning, and on a 114-mile section of quadruple road some 6,800 car loads—probably 200,000 to 300,000 tons—of dirt are extracted from the ballast every year. It will be seen. therefore, how important ballast cleaning is considered in the U.S.A., and on what an extensive scale it is undertaken.

* * * *

High Speed in Switzerland

THIS year the centenary celebrations and the International Railway Congress in Switzerland have tended to overshadow the remarkable progress that has been made in that country in the speed of its internal rail communications. Some of the timings which have come into force in the 1947 summer timetables must be among the fastest in the world relatively to the gradients over which they are maintained. They have been made possible by the introduction of electric motive power of exceptionally light weight, as well as the introduction on an extensive scale of lightweight rolling stock, both of which have been described and illustrated in recent issues of *The Railway Gazette*. Moreover, the accelerations have not been confined to important main lines of the Swiss Federal Railways system, but have taken place on narrow-gauge and privately-owned systems also.

Of main lines, it is on the trunk route between Geneva, Lausanne, Berne, and Zurich that the most striking developments have taken place. The quickest time for the through journey of 178·5 miles has now been brought down to 3 hr. 10 min. in each direction (56·4 m.p.h.), including 5 min. spent at the Lausanne and Berne stops. In addition to the ordinary express service, five lightweight expresses run each way daily, averaging in journey 3 hr. 29 min., as compared with two only before the war. Over the level stretch of 37·4 miles between Geneva and Lausanne, three trains are timed in 34 min. (66 m.p.h.), one in 35 min. (64·1 m.p.h.), one in 36 min. (62·3 m.p.h.), one in 37 min. (60·6 m.p.h.), and three in 38 min. (59·1 m.p.h.). A new early morning flyer, at 4.40 a.m. from Geneva, runs to Nyon, 13·5 miles, in 13 min., and from there to Morges, 16·1 miles, in 16 min.; after making eight intermediate stops, it brings its passengers into Zurich by 8.10 a.m. In the reverse direction, it is now possible to leave Zurich as late in the evening as 9.53 p.m. and to reach Geneva at 1.11 a.m., with six stops in the journey of 3 hr. 18 min. One astonishing timing on this service is from Lausanne to Berne, 60·4 miles, in 65 min. (55·8 m.p.h.), notwithstanding the formidable initial climb of 10 miles averaging 1 in 55 to Corbéron, and the severe slowing through Fribourg.

In other parts of the country there are main-line schedules now in force which are faster than ever previously. For example, the quickest Zurich-Basle times have been brought down to 64 min. eastbound and 67 min. westbound for the run of 55·3 miles (51·8 and 49·5 m.p.h.), although there are severe grades between the Rhine and Aar valleys and a slowing through Brugg. There is fast running also over the Lausanne-Neuchâtel-Bienne-Basle line by lightweight trains, with timings up to 55·8 m.p.h. (Lausanne to Yverdon). New trains have been put on which reduce the fastest journey time between Basle and Geneva to 3¼ hr. for the 155·4 miles; there are now four lightweight services in each direction over this route also.

Some train service developments of exceptional note have taken place over the privately-owned metre-gauge Montreux-Oberland Bernois line, which forms the direct communication between the eastern end of the Lake of Geneva and the Interlaken area. From Montreux to Jor, at the entrance to the tunnel under the Col du Jaman, the M.O.B. has to climb 2,322 ft. in a distance of no more than 8¼ miles, which it does on continuous grades of 1 in 14½ to 1 in 16, worked entirely by adhesion. Jor is at an altitude of 3,542 ft. above sea level, and from there the line drops to Montbovon, 2,625 ft., then climbs the Gstaad to its summit level at Saanenmöser. 4,173 ft., with a final descent to Zweisimmen, at 3,100 ft.

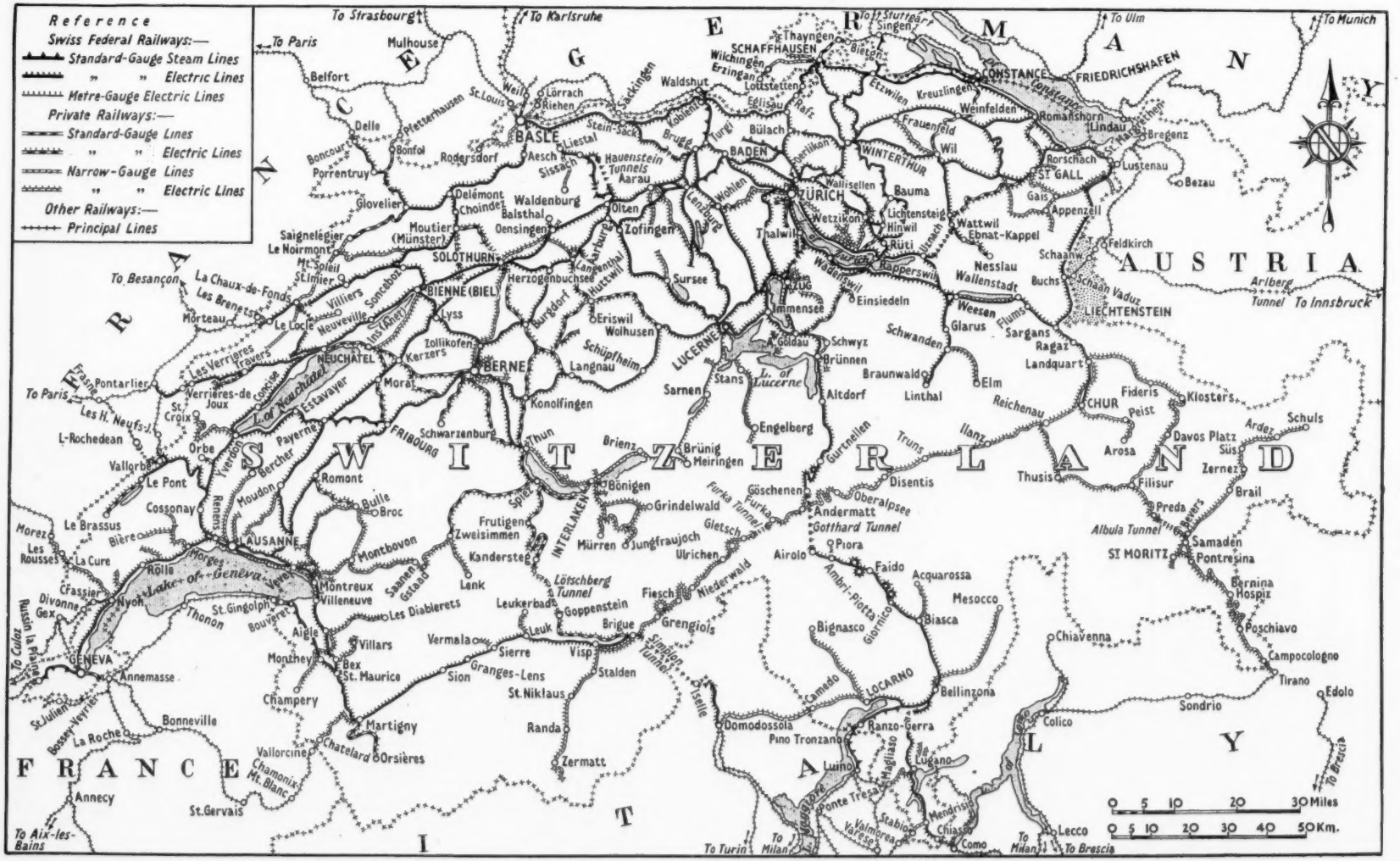
With the aid of new lightweight stock, and several realignments of the track to reduce curvature, the time for the 39 miles between Montreux and Zweisimmen has been cut to 102-105 min. (22¼-23 m.p.h., including two stops), and trains making numerous stops make the journey in just over 2 hr. This compares with times of from 2 hr. 17 min. (minimum) to just over 2½ hr. last year. With the help of the Berne-Lötschberg-Simplon standard gauge service between Zweisimmen and Interlaken, maintained largely with fast railcars, the trip between Interlaken and Montreux can now be completed in 2 hr. 56 min. to 3 hr. 8 min. three times daily each way, as compared with from 3 hr. 43 min. to 4 hr. 20 min. last year, an average acceleration of about an hour.

Another route over which improvements in time continue is the Brunig metre-gauge section of the Swiss Federal, with its rack-and-pinion section over the Brunig pass, electrified during the war. There are now five fast trains in each direction averaging 2 hr. 2 min. between Interlaken and Lucerne, as compared with four averaging 2 hr. 12 min. last year, and the stopping trains are half-an-hour quicker than in pre-electrification days. The Furka-Oberalp, another line which has gained a full hour on its through journeys as a result of war-time conversion from steam to electrification, continues its unique feat of working a restaurant car train over 1 in 9 gradients on the rack-and-pinion ascents to the Oberalp pass. 6,700 ft. above sea level. This summer through coaches have been restored over this route between St. Moritz and Brigue—the pre-war "Glacier Express"—but have not as yet been extended to and from Zermatt. The journey from St. Moritz to Brigue takes 7 hr. 52 min., as compared with 9 hr. 12 min. before the war.

In all parts of Switzerland increasing use is being made of lightweight electric railcars for the acceleration of branch and subsidiary main-line services, with advantage both to speed and frequency, and there is little doubt that the main-line accelerations will be extended in other directions as soon as more lightweight locomotives and coaches in Switzerland become available.

The Swiss Railway System

(See article opposite on "High Speed in Switzerland")



The railways of Switzerland, showing Swiss Federal and private ownership, standard and narrow gauge, and electric and steam traction

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Underground Coach Design

55, Broadway, Westminster,
London, S.W.1. August 20

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In reply to the letter of Mr. G. M. Barrett in your issue of August 15, suggesting that Underground coaches should have six double-doors per side, it is pointed out that sliding doors would have to be used, and that door pockets are necessary into which the doors can slide when open. A 4-ft. 6-in. doorway, therefore, requires a mathematical minimum of 9 ft. of doorway plus pockets, to which must be added mechanical margins. Six such doorways would therefore be 54 ft. long, compared with a car length of only 51 ft. Seats could be arranged only opposite the door pockets, and the total seating accommodation thus would be reduced to 24.

Past experience has shown that it is not practicable to induce the London public to separate themselves between entry and exit doors, any more than it had been found practicable in New York. The original cars installed when the District Railway was electrified were intended to be used in the way suggested by your correspondent, but the practice had to be abandoned.

With regard to ventilation by the very simple method adopted by the Paris Metro, Mr. Barrett has overlooked the fact that the Paris Metro trains run in the main in tunnels where weather conditions do not have to be catered for, whereas the Board's trains run in the open, and the effect of a 6-in gap in the clerestory would be that the car often would be flooded with rain water.

The matters referred to by your correspondent are naturally of great importance to the Board, and are constantly under consideration.

Yours faithfully,

J. H. BREBNER
Chief Public Relations & Publicity Officer

Power Reverse Gears

61, Rupert Street,
Glasgow, C.4. August 17

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—With reference to Mr. Slee's reply in your August 1 issue to my letter on power reverse gears published on July 11, I fear he has largely lost the main point of my reason for writing on the subject. Mr. Slee appears to take exception to my remark re maintenance, but if fitters of railways in the Colonies are able to maintain steam reversers in proper working condition, it does not say much for British locomotive shed staff that they are unable to do likewise. Moreover, if the steam reversers on the "Merchant Navy," "West Country," and "Q 1" classes are kept in working order by the Southern Railway locomotive staff, there does not seem to be any reason why the L.N.E.R. is unable to follow.

Mr. Slee considers power reversing unnecessary on main-line locomotives; this may be so, but how much easier it is to slacken a coupling, check slipping, and reverse quickly when cranks are on a bad position for starting, when a steam gear is fitted. As Mr. Slee himself states, there are types of screw gear which require more strain to move than should be necessary.

Regarding shunting engines, I quite agree that it is possible to design a locomotive in which the motion is quickly and easily reversed by a lever, but how often is this the case, and the majority of shunting work is performed by 0-6-0 tank or tender engines with slide valves and Stephenson link motion, either with lever or screw gear.

By a curious coincidence, in the issue in which Mr. Slee's letter is printed, there is given a description of an 0-6-2T for Calcutta Docks. These locomotives, which, according to the article, are intended purely for shunting duties, are fitted with screw reversing gear requiring ten turns from one full gear to another. Comment here is unnecessary!

Mr. Slee states his experience of steam reversers has been mostly of the North Eastern type; I venture to suggest that with the exception of the gear fitted to a few locomotives on the Midland the N.E. pattern is the most unsatisfactory of all steam gears, and had Mr. Slee experience of the original Stirling gear—almost universal on the Glasgow & South Western Railway—he probably would hold steam gears in much higher esteem. This gear, which was placed in the cab where access to glands and valves is easy, gave entire satisfaction, and probably less trouble in maintenance than many present-day forms of screw gear.

Yours faithfully,

MONTAGUE SMITH, JR.

Indicating Train Speeds in Signal Boxes

41, Hylton Street, North Shields,
Northumberland. August 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The recent railway accident, near Polesworth, on the L.M.S.R., brings to my mind the disastrous derailment which occurred at Leighton Buzzard, on the same system, some years ago. Between the two, several similar accidents have taken place, and all due to the same cause; overspeeding while rounding a curve.

Shortly after the Leighton Buzzard accident I devised an instrument which, had it been in use, would have avoided such mishaps. It is a device which tells the signalman whether an approaching train is travelling within a safe speed.

It is, in fact, a speed-measuring machine, but it is not an ordinary speedometer. My device is attached to the track and gives the speed on a dial placed in the cabin, or in any convenient place. It is self-resetting, gives the data almost instantaneously, and, if desired, prints it on a tape and, by extension, telegraphs it to a distant point automatically.

However, for speed-limiting purposes a simple form of the machine may be preferred. In this case the signalman only gets to know whether the speed of the train is low enough for him to allow the train to take the curve. The device then becomes fairly cheap to make. In a slightly more complicated form, it keeps the signal locked if the speed is too high; and, finally, it can be arranged in such a way that the train itself lowers the signal if travelling within the set speed, the signalman having already released it.

I shall be very pleased to know whether our railways, or any of the signal makers, are interested in this instrument.

Yours faithfully,

RICHARD JANMART

[Apparatus of this kind might be useful at certain locations, and has been applied, we believe, here and there in some countries; but there are many curves with no signal or signal box near them, any one of which might be taken at excessive speed. For such equipment to function in all circumstances it would have to be combined with some fairly complete form of automatic stop and speed control, and be independent of a signalman's actions. It cannot cover derailments that arise from the track itself not being in condition to be passed over at the permitted speed, as has happened sometimes. At Leighton Buzzard all the signals were against the train and were ignored, and the signalman could have done nothing effective, even if he had been advised of the speed.—ED. *R.G.*]

Alleged Railway Inefficiency and its Cure

Hampstead. July 27

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In your issue of August 1, you printed a letter of mine commenting on the lack of mobility in our freight train services in 1946. "Controller" retorts in a letter which appeared in your August 15 number that I did not refer to the increase in 1946 ton-miles over 1938. Actually my letter stated that freight train-miles were 2 per cent. above 1938, while the average train-load was 25 per cent. up. Could there be a clearer way of indicating that the ton-miles moved in 1946 were about 27 per cent. more than in 1938? What a rich field for train controllers to work in! And with plenty of elbow-room, all the companies intentions of improving passenger train services being shelved for want of coal! Yet our operators could do no better than move 960 ton-miles in an average freight train hour, as compared with 945 in 1938. This betterment of only 1·5 per cent. contrasts badly with the feat of the American railways in lifting their statistic by 28 per cent. between 1939 and 1946.

"Controller" calls 1924 the peak pre-war year, but 1920 was well above it. A comparison with these years does not help, as in both of them the coal trade was busy and accounted for more than half the ton-mileage in 1924.

It is better worth recalling that in 1913 the old railway companies handled 364,000,000 tons of traffic, nearly 39 per cent. more than the 1946 tonnage. On the whole traders and the public were well served before the first world war. Can anyone assert that the community is equally well served today, in spite of the millions spent on new facilities since amalgamation and the multiplication of train controls?

Yours faithfully,

STATISTICIAN

The Scrap Heap

A young and ambitious Socialist member, looking one day at the Government front bench, was heard to remark: "The most interesting thing about those fellows is that ten years hence most of them will be dead." Attlee, Alexander, Bevin, Dalton are all much of an age.—*W. J. Brown, M.P., in the "Evening Standard."*

* * *

Happy Days Gone For Ever

A letter signed F. H. Crawford, of Twickenham, appeared in the correspondence of *The Observer* of August 3, and included the following passages:—

"In my sixtieth year, after 23 years driving London buses, and with memories of 37 previous years on the once free and open roads of England, I find myself put on the shelf. Why? Because I refused the demand, backed by London Transport, that I should leave the National Passenger Workers' Union—known as the 'Little Union'—and join the Transport & General Workers' Union.

"I have been asked why I would not rejoin the T.G.W.U., knowing that the alternative was dismissal. Well, I was a member of that organisation for 20 years. I saw it degenerate from a union to improve the workers' conditions into a machine to finance its leaders' political ambitions. Now the leaders are in the saddle, with four-figure incomes, and they are striving to gain control of everything and everybody. Their invariable parrot-cry is: 'Look what wages we have got you. Your fathers earned only about 30s. a week, and we have got you £7 10s.' Well, I lived in the 30s. days, and I know that we were happier then than the present generation will ever know how to be.

"We made our own amusements. Everything was plentiful and cheap; the coalman with his horse and cart was up and down the road nearly every day. It was possible to save on 30s. a week; if you can do it now on £6 and £7 you need to be a magician.

"That is what they always forget to mention—high wages mean high prices for everything, so where is anyone better off?" —*From "Motor Transport."*

* * *

100 YEARS AGO

From THE RAILWAY TIMES, *Aug.* 21, 1847

RAILWAY DIRECTORS and Others requiring a SUPERINTENDENT, who combines a thorough knowledge of the principles and mechanical details and arrangements of railways, engines, canals, hydraulic, and other works, and who could take the place (if necessary) of engineer in future operations, and whose endeavour would be to improve and render the works under his charge the most efficient and profitable, which experience and a varied and perfect knowledge alone can accomplish.

Apply by letter, pre-paid, to C. E., care of Messrs. Groombridge and Co., 5, Paternoster-row, London.

RUGBY and HUNTINGDON RAILWAY.—FINAL NOTICE to SHAREHOLDERS.—The Committee of Management beg to announce to those shareholders who have not sent in their vouchers to claim the second and third dividends, that the offices will be closed the first week in September, and that such parties as have not sent in their claims by that time will be charged with any further expenditure.

By order of the Board.

11, Old Jewry Chambers, August 27, 1847.

GREAT WESTERN RAILWAY.—ACCELERATION of TRAINS.—On and after the 1st of September, 1847, the LONG TRAINS on this railway will be ACCELERATED. The departures from the intermediate stations on the line will consequently be different from the present time table. New bills showing these alterations may be had, on application, at the railway stations.

By order of the Directors,
CHAS. A. SAUNDERS, Secretary.

August 26, 1847.

* * *

Passengers Locked on Platforms

Because one of the automatic doors would not open and close properly, an early train on the District Line today had to be taken out of service at East Ham.

That caused a ten-minute hold-up to other trains—among them a staff train.

On that staff train was the inspector who had the keys of Aldgate East station.

Until he got there no one could get on to the platforms, which did not, perhaps, matter a great deal.

What mattered more was that passengers who had alighted from trains at Aldgate East could not get off the platforms.

By the time the inspector arrived there were hundreds locked in. And then—the stampede. — *From the "Evening Standard," August* 22.

* * *

Hari-Kiri at Kings Cross?

There are 17 men at Kings Cross Station, L.N.E.R., who make 37,000 entries each year in 18 different books, and who probably see as many smiles of relief as anyone else in London; they are the "Lost Property" men. All articles left in trains on the Southern Area of the L.N.E.R. find their way to the Kings Cross Lost Property Office, and of the 37,000 articles received there each year, only 20 per cent. are ever claimed; attache cases are lost at the rate of 250-300 a month. On one occasion a performing dog (afterwards claimed), walking on its hind legs the whole time, insisted on following an attendant around, and on another, a monkey was "on hand" until it was given to the Zoo.

Unusual articles brought in include a Japanese beheading sword, a tin of live fish in water, artificial limbs and crutches, and a belt containing American dollar bills and 10 gold dollar pieces.

* * *

Passed to You, Please

Mr. Dalton, having notably failed to be a public blessing himself, did, at the end of his broadcast, hand the matter on to higher, even celestial, levels, with a "Passed-to-You, please," in the best Civil Service manner. Yes, a most gentlemanly crisis.—*From "The Observer."*

* * *

A Mile-a-Minute Underground

A train on New York's underground went crazy the other day. It passed stations where it should have stopped. It stopped in tunnels. It went 60 miles an hour. Reason: Motorman drunk.—*C. V. R. Thompson in the "Daily Express."*

* * *

SOME RAILWAY MEMOIRS—3
By Sir Sam Fay

A Proposed North Sea Train Ferry

The Swedish Government proposed a train ferry between their ports and England. I offered to accommodate them at Immingham Dock, which had been opened a short time. . . .

When labour committees were first established the Chairman of the Company, Lord Faringdon, insisted upon taking the chair on the Company's side, because, he said, "I'm not going to let you give away the Company's money."

At the meeting he was confronted by a goods guard, who planted his clenched fist, about the size of a small ham, upon the table in front of him. The tone of the meeting was acrimonious.

Lord Faringdon did not attend again. . . .

In connection with the burial of the Queen a curious dispute arose between the Admiralty and the Duke of Norfolk, the Earl Marshal. He had made arrangements for the train to start from Portsmouth. The Admiralty fixed upon Gosport as the port to which the royal yacht was to go. The General Manager and I went to the Earl Marshal's office to explain the difficulty we were in by receipt of conflicting orders. He got very angry, said he would have no more to do with it, and drove us out of his room. He contended it was his duty to arrange for the funeral of a Sovereign.

"Yes," said the Admiralty, "that may be so on land, but we are on the sea; you have nothing to do with that."

The Admiralty had their way.

The body of the great Queen was taken from Osborne to Gosport the evening before departure for London. The royal yacht with the coffin covered by the Royal Standard steamed slowly between serried lines of battleships moored all the way from Osborne bay to Portsmouth harbour. The sun, a blood red ball of fire, was sinking in the west. An exceptional sun even for that time of year. The scene was never to be forgotten by the thousands who lined the banks on either side of the Solent.

The next morning it rained hard. Raindrops pelted down on the corrugated roof of the corridor from the ship's side to the side of the train. When King Edward, the Earl Marshal, the equerries, and others had taken their seats, I gave the signal for the funeral train to start for London, where it arrived at Victoria Station exactly on time. . . .

LANGDON'S LONDON

"I hear we're inventing a machine which fights back"

[From the "Evening Standard"

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Cape Town Foreshore Scheme

The Cape Town Foreshore Joint Technical Committee, on which the South African Railways are represented, has completed its labours, and the final report has been sent to Mr. F. C. Sturrock, Minister of Transport, with the recommendation that it be adopted as soon as possible, and the financial responsibility apportioned.

The report estimates that the work, apart from the construction of buildings, will cost £13,300,000, spread over 40 or 50 years. The physical barrier of railway lines dividing the area was a major problem. Among the recommendations made was one that the programme of railway works be proceeded with without delay, as the development of the reclaimed area depends on the rapid completion of this programme.

Buildings and works occasioned by the re-location of the railway passenger station, maritime station, and the goods layout, and buildings to be erected on the foreshore area, are not included in the estimate quoted above.

The construction of the new goods depot and the picking up of the old Dock Road railway tracks are in particular a pre-requisite to the development of the reclaimed area. It is understood that the time programme for undertaking the major railway works is: goods depot and offices, and administrative block, 1947; maritime terminal and Van Riebeeck Hotel, 1948; railway passenger station, 1950. Brief details of the new railway works were given in *The Railway Gazette* of February 8 and September 6, 1946.

WESTERN AUSTRALIA

Ten-Year Programme Sanctioned

The State Government has sanctioned an expenditure of £2,819,500 on new locomotives and rolling stock, this expenditure to be spread over a 10-year period. The first 15 months of the period expired on June 30 last, and this section of the programme included 7 locomotives, 4 sleeping cars, 4 saloon coaches, and 100 wagons. An additional 10 locomotives and 2 dining cars are also in hand. Altogether, 62 locomotives, 48 coaches and 1,040 wagons are programmed for construction during the first five years.

INDIA

Division of Bengal Assam Railway

Consequent on the partitioning of India, the broad-gauge section of the Bengal Assam Railway falling within Pakistan will be known as the Eastern Bengal Railway. The broad-gauge section south of Chandmari will constitute a separate division, and will be attached to the East Indian Railway as the Sealdah Division.

The metre-gauge section of the Bengal Assam Railway beyond Gitaldaha and Badarpur, and falling within the Dominion of India, will be known as the Assam Railway. In addition to the above, a small portion of the western metre-gauge section of the Bengal Assam Railway falling outside the Pakistan area will be attached to the Oudh Tirhut Railway.

The Governments of India and Pakistan are appointing two officers for each of the railways to be partitioned (the N.W.R. and the B.A.R.) for planning and arranging the programme of transfer of staff from Pakistan to India, and from India to Pakistan. These officers will be known as transfer officers, and are being posted at Lahore and Calcutta. The transfer officers also will be the channel of information for movements of railway staff from Pakistan to India and vice versa. Their duties will be to arrange such transfers with the minimum inconvenience to the staff concerned. As the number of staff to be interchanged is in the region of 52,000, which involves a displacement of nearly twice that number of employees, the process necessarily will have to be spread over a period of time.

CHINA

Restoration of Chekiang-Kiangsi Railway

Reconstruction is progressing rapidly on the Chekiang-Kiangsi Railway. The rehabilitation of this system, which crosses Chekiang, Kiangsi, and Hunan Provinces, began last February. By the middle of March the 67½-mile section between Kinhua and Chüki was completed. On June 5 the Pingsiang-Chuchow section, which connects Kiangsi and Hunan, was opened to traffic. Ten days later, trains began to run between Nanchang and Kiukiang, a distance of 80 miles. Three sections of the line are still unfinished; Kinhua-Chuhsien; Shangjao-Nanchang; and Nanchang-Pingsiang; in all about 360 miles. Given sufficient material, reconstruction of the entire railway is expected to be completed towards the end of this year.

UNITED STATES

"City of San Francisco" Runs Daily

As from September 1 the "City of San Francisco" streamline train will run daily between Chicago and San Francisco, instead of three times a week. The train is owned and operated jointly by the Chicago & North Western, the Union Pacific, and the Southern Pacific. This will place all the fleet of "City" streamliners on a daily basis. Departure and arrival times will be unchanged, and the schedule between Chicago and the West Coast remains at 39¾ hr.

The "City of San Francisco" made its first trip on June 14, 1936, on the basis of five return journeys a month. This was increased to ten trips a month on July 26, 1941, with the addition of a second "City of San Francisco" train, and on June 2, 1946, the number of trips was increased to three a week.

CANADA

Goods Traffic Recovery

According to estimates released by the Dominion Bureau of Statistics, railway revenue freight tonnage during May increased sharply from the preceding month and was at its best level for May since 1944. The total for the month has been estimated at 9,279,000 tons, an increase of 1,874,000 tons, or 25·3 per cent. over the previous month, and a gain of 1,388,000 tons over a year ago. Freight loaded for the first five months of 1947 totalled 39,858,000 tons, a slight increase over the aggregate of 38,490,000 tons for the corresponding period of 1946. Wagons loaded totalled 345,000, a record high for the month and 74,000 above the April figure. Compared with the May, 1946, figures of 296,000 wagons, the number loaded was up by 49,000. Wagons loaded in the first five months of the year aggregated 1,534,000, an advance of 6·7 per cent.

TURKEY

Rolling Stock Purchases

Various acquisitions of locomotives and rolling stock have been made recently by the Turkish State Railways from outside sources. A railway mission to the Middle East has purchased 24 locomotives from the office of the U.S. Foreign Liquidation Commissioner, as well as 204 goods wagons from U.N.R.R.A. Further purchases of locomotives and wagons have been made from the office of the Foreign Liquidation Commissioner in Paris, and orders have been placed in Czechoslovakia for 30 postal vans.

Earlier this year the State Railways received a delivery of 20 wagons from Czechoslovakia, forming the first batch of an order for 2,100 freight wagons and passenger vehicles which was placed at the end of 1946. It is expected that deliveries will be accelerated during the coming months.

HOLLAND

Summer Timetables

On May 4 the Netherlands Railways put new timetables into operation. The timetable of August 15, 1945—the first to be issued after the liberation—was a small folder showing very few trains and giving no idea of what was to be accomplished during the next twenty odd months, as the lines were restored stage by stage to something like their original efficiency. The journey from Amsterdam to Maastricht then took from 8.36 a.m. to 10 p.m., with bus communication to fill the gap between Blerick and Roer; again using a bus connection, 8½ hr. were needed to reach Groningen and Leeuwarden.

The timetables issued in May, 1946, marked a great advance in facilities. The re-opening of the Ijssel bridge at Zwolle gave a direct connection with the northern provinces, and eliminated the long detour from Zwolle to Amersfoort *via* Deventer and Apeldoorn.

Communications with the south had been improved earlier, with the aid of a bus service between Geldermalsen and s'Hertogenbosch, enabling Maastricht to be reached 2 hr. earlier.

Increased Mileage Operated

In the 12 months then ended the route-mileage operated had risen from 749 to 1,789 and the daily passenger train-mileage from 1,182 to 27,000. The work of restoring bridges, which went continuously forward, enabled the timetable to be improved progressively and a great advance was made by the restoration of traffic across the Moerdijk Bridge in August, 1946, followed by the Maas Bridge at Hedel. Unfortunately the replacement of lost or damaged rolling stock has not kept pace with other work, and on the present timetable 20 railway bus services have had to be included as temporary expedients, but some previously operating have been abolished. The total route mileage covered by the new timetable is 1,931.

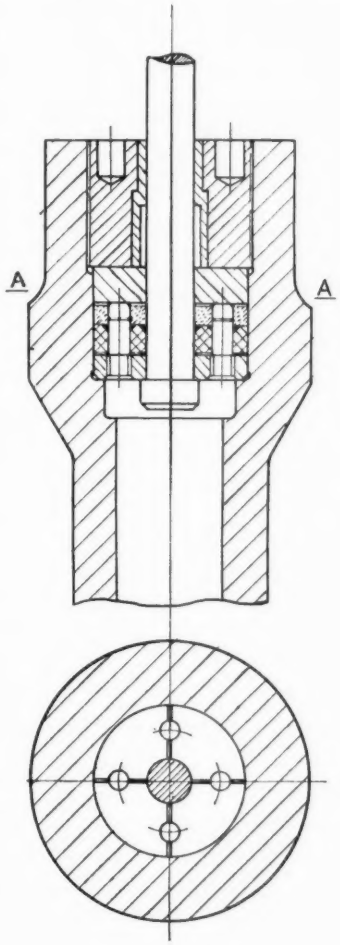
Connections with other countries have been improved considerably and made more frequent, and internal services are restored to such a degree that with the exception of certain lines in the vicinity of frontiers, passenger services are being run practically everywhere, although at times with the aid of buses.

Liquid Springs*

A brief account of their principles, construction, and application

IN 1938, Mr. G. H. Dowty conceived the idea of using the compressive properties of liquids as a spring, and at the same time making the same volume of fluid used act as the dashpot medium. The first patent covering the system was taken out in 1939. From that date, intensive research was carried out by Dowty Equipment Limited, and in due course data obtained to develop the idea.

The first experimental cylinder had a bore of ¼ in. and an outside dia. of 1½ in., the plunger being $\frac{15}{32}$ in. dia. The gland



Gland assembly

was a simple disc of synthetic rubber about ¼ in. thick, with a substantial initial interference on both the inside and outside diameters. There was a metallic washer on each side of the gland, and the gland assembly was substantially backed by a solid gland nut screwed into the cylinder. The plunger was forced into the cylinder by a hydraulic press, the load being measured by a pressure gauge in the hydraulic circuit, and the deflection of the plunger measured directly. The ram of the press was a mechanical fit in the cylinder, so there was no gland friction due to the machine.

A light mineral lubricating oil was used as the compressed liquid, and a pressure of about 100,000 lb. per sq. in. was reached. There was, however, distortion of the various parts, with seizure of the plunger, stretch of the cylinder barrel, and an appreciable amount of leakage. For further experiments, the outside diameter of the cylinder was increased to 1¾ in.

Experiments showed metallic glands to be suitable for pressures above a few thousand pounds per square inch. A more resilient gland was tried, but though better sealing was obtained, it was extremely difficult to dismantle the gland nut screwed into the cylinder. Examination showed the "inner" washer on the plunger side of the gland ring to be dished, assuming a concave form under the high pressure acting on one side of it.

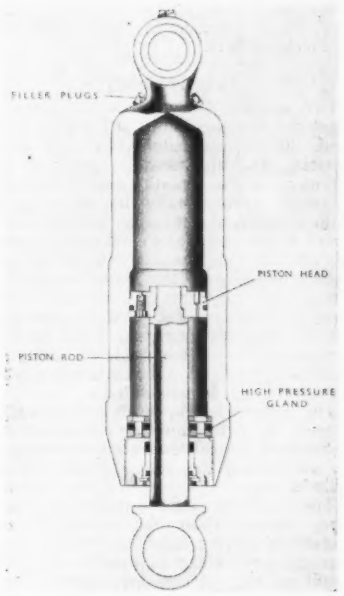
After a number of devices to eliminate this phenomenon had been tried, the introduction of a foraminated layer between the gland and the inner washer was found to give a satisfactory solution. This layer, in practice, is made of two discs of wire gauze arranged so that the meshes lie at 45 deg. to one another. At this stage, it became apparent that the use of a pressure of 100,000 lb. per sq. in. was fraught with too many difficulties, whereas the experiments had shown promise at pressures around 50,000 lb. per sq. in.

Strength Considerations

Stress due to internal fluid pressure in a cylinder is highest on the inside and lowest on the outside. This difference increases with the cylinder thickness; therefore, the thicker the material the lower the efficiency of the material from the viewpoint of strength. Pre-stressing was tried, to give a more even stress distribution throughout the cylinder wall, but, though satisfactory in the laboratory, it offered practical difficulties and was abandoned. The use of high-tensile steel for the cylinder, however, permitted a relatively thin, and, therefore, efficient cylinder for pressures up to 50,000 lb. per sq. in.

Lamé's theory for calculating the strength of thick cylinders, which can be verified by tests on photo-elastic models, breaks down on reaching the plastic state; and experiments show that the final bursting pressure exceeds considerably the figure given by Lamé's formula.

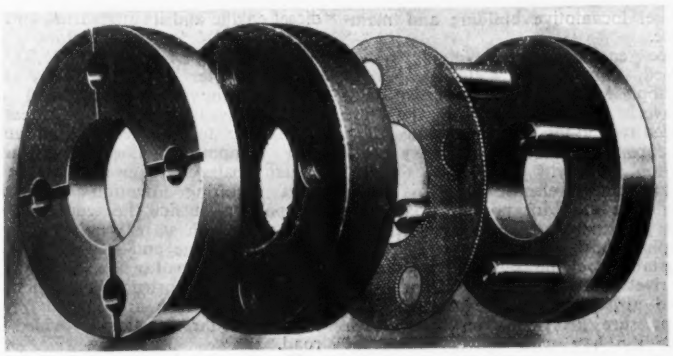
Experimental results show that there is an optimum range of pressures which can be plotted against total cylinder weight. For each class of steel, the curve falls to a minimum and then starts to ascend again; for the materials tested, 45,000-50,000 lb. per sq. in. is the optimum maximum pressure. Similar curves plotted for external volumes also show that little is gained by taking the maximum pressure much above 50,000 lb. per sq. in. Other constructional considerations emphasised the formidable stressing difficulties on the piston rod (and



Liquid spring almost fully compressed

the essential eye end of it) when pressures exceed 50,000 lb. per sq. in.

It is comparatively easy to design a gland having long life at high pressure, provided a small amount of leakage can be tolerated. Alternatively, it is not too difficult to design a gland which will not leak at high pressure, provided the amount of friction and the endurance can be ignored. To obtain a balance between these conflicting trends, the "unsupported area" type of gland (British Patent No. 539,666—filed June, 1940) was developed. The internal pressure acts on the full area of the gland ring, but the outer face of the gland ring is less than the inner



Exploded view of gland assembly

* Paper presented by Mr. R. H. Bound, M.I.Mech.E., before the Society of Engineers (Inc.) in London on March 3, 1947. Abridged

by the area of the pegs provided. As the forces in opposite directions must be balanced, the pressure on the gland ring is higher than the fluid pressure; thus, leakage is eliminated. Chamfer rings round each peg prevent extrusion of the comparatively weak material of the gland into the clearances necessary to allow considerable movement of the plunger and minute movement of the pegs.

A wide variety of materials—ranging from wood to silver—was tried for the gland ring. Final choice was limited to a very small number of fabric-reinforced synthetic rubbers.

Compressibility

For specific design it is necessary to know the compressibility of the fluid to be used, the compressibility of the gland material, and the elastic stretch of the cylinder. These quantities have been determined experimentally first by using the plain cylinder, and then by inserting a steel sleeve in the cylinder to reduce the initial oil volume, or, alternatively, inserting a known quantity of the gland material in the cylinder. By running three tests in the three different conditions, three equations may be obtained from which the *absolute* compressibility of the fluid, the compressibility of the gland material, and the cylinder stretch can be calculated.

The *apparent* compressibility of a fluid is made up of the *absolute* compressibility of the fluid, the *absolute* compressibility of the gland, and the elastic stretch of the cylinder.

The apparent compressibility is, therefore, greater than the absolute compressibility of the fluid; and it is the apparent figure which is used in designing liquid springs. Increasing the maximum pressure does not reduce the weight of the apparatus proportionately, and beyond a certain point the weight actually increases with pressure, because (1) the instantaneous compressibility of all fluids decreases with increasing pressure, and (2) the strength efficiency of the cylinder decreases with increasing pressure.

Curves of apparent compressibility have been obtained for a number of liquids, but the suitability of a fluid is not determined by its compressibility alone. It must be a reasonably good lubricant, have a low pour point, a reasonable flashpoint, and should not be toxic or otherwise unpleasant to handle.

As no satisfactory equation has been found to represent the compressibility curve of any fluid, nor any relationship to other properties been established, it has been necessary to carry out a test on each fluid suggested. The general trend is for the more compressible fluids on the same "base" to have a greater coefficient of expansion and a lower viscosity. The "base" may be (for example) petroleum, castor, silicone; and no relationship has been discovered between the compressible properties of fluids with different chemical bases.

If springing only is required, a liquid spring may consist of a plunger gland to a vessel of any shape having a suitable volume and strength. But if a shock absorber is contemplated, there must be (1) a springing medium and (2) means of absorbing and dissipating energy. The easiest way to absorb energy is to push the fluid through an orifice and dissipate the resultant heat by radiation and convection.

This is commonly known as a dashpot, and if it is to form part of a liquid spring, the plunger can be provided with a piston head having the necessary orifices; this necessitates a cylindrical vessel. If the shock absorber is for aircraft landing-gear or for a vehicle or certain types of machine, the orifices usually have valves so that on recoil a number of them are closed, thus retarding the outstroke velocity.

The fluid under compression is also the dashpot fluid; the piston head has no influence on its compression, which is caused by displacement of the piston rod only.

Filling Process

The filling of a liquid spring is easy and requires no elaborate apparatus. Two filler plugs are provided; oil is supplied from a small hand pump and the air is ejected from the second filler plug. Nothing else is needed if the working temperature range is small. If, however, the working temperature falls considerably below the filling temperature, slackness may arise in the unit, and the rod will not be fully extended at no load. To overcome this trouble, a high-pressure filler valve has been introduced so that a pressure of about 2,000 lb. per sq. in. can be built up with an ordinary grease gun filled with the oil to be used in the spring.

The gland nut is hollow, and the annular space round the piston rod is filled with special grease, preferably containing colloidal or powdered graphite, to lubricate the rod which will emerge dry because of the efficiency of the gland.

Materials and Testing

The identifying numbers of the specifications for suitable materials for the cylinder are "S.2" or "S.11" for moderate pressures where weight is not important; "S.65" for moderate pressures where weight is of some importance; and "DTD.331" for highest pressures and (or alternatively) where weight is of primary importance, as on aircraft. The piston rod is made from either "S.65" or "DTD. 331"; the finish is most important. An ordinary ground finish would soon ruin the gland.

Fine grinding should be followed by a heavy deposit of chromium plating which after re-grinding should be buffed or lapped.

Liquid springs are largely used on aircraft; a "Halifax" bomber has completed over 500 landings without the shock absorbers receiving any attention. Nevertheless, every shock absorber undergoes shop and field tests. In shop tests, the absorber is compressed until a certain load is obtained; then a trip-gear releases the load and the unit extends to its full initial length. An automatic device causes this cycle to be repeated; the number of repetitions, with the measurements and temperatures, also are recorded.

Field tests employ special taxi-ing equipment comprising a parallel linkage attached to the reinforced chassis of a powerful car so that (say) a tail-wheel can be drawn along with a known load applied to the unit. Recording devices are attached to the mechanism, and the car is driven over various types of road surface in all weathers and over rough fields, as long as the car is manageable, so that the severest conditions are fully represented.

For aircraft work, drop tests are made with electronic recording, so that stroke-reaction curves can be obtained and checked against those calculated. During these tests the orifice sizes are finely adjusted so as to give the correct energy absorption and recoil characteristics.

Derby Paint Shop Converted for Diesel Repairs

Part of the paint shop at Derby Locomotive Works, L.M.S.R., has been partitioned off and is now devoted exclusively to diesel locomotive building and maintenance.

Three engine roads with pits are provided, running the 450-ft. length of the shop. Lifting facilities consist of a new overhead crane gantry on which are mounted two 50-ton travelling cranes. The cranes are fitted also with auxiliary hoists of 10-ton capacity.

A low-voltage electric supply is wired through the shop for portable inspection lamps, and there are several single- and three-phase power points for the operation of portable welding sets and resistance-type rivet heaters. Pipelines for compressed air, high pressure oxygen, and low pressure acetylene run along each side of the bay, with delivery valves at intervals.

The repairs to be carried out are classified as general, service, and casual. General repairs are scheduled on a basis of 60,000 miles, or after 7-8 years' running.

They include complete stripping of the diesel engine and its auxiliaries, and of the transmission and generators. Service repairs are performed at 25,000-30,000 miles, or after 3-4 years. They are concerned mainly with the diesel engine, which is partly stripped for attention to bearings, pistons, valve gear, and fuel injection equipment. Locomotives undergo casual repairs as required, these being repairs requiring attention to individual components outside the scope of the running shed, such as may be necessitated by collision damage and so on.

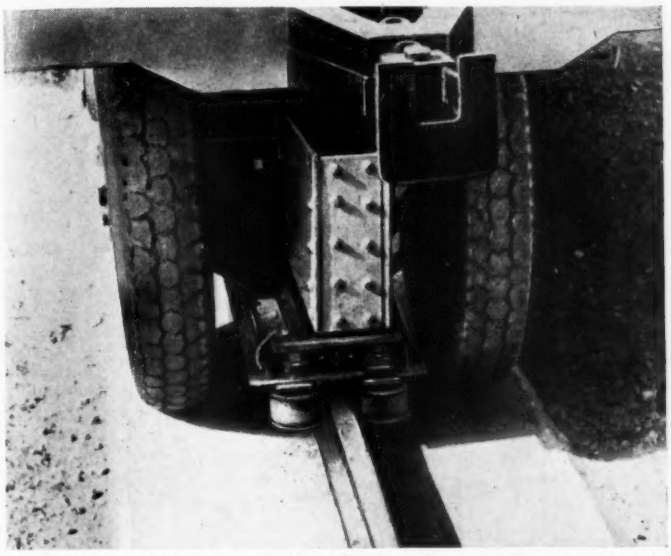
The middle road in the shop is arranged also for the construction of new diesel locomotives, which are erected from start to finish at three sections provided on this road.

Two test berths are provided, complete with hoods for conveying the exhaust to atmosphere and overhead tanks for fuel oil, so that engines under test can be filled up rapidly. An artificial load is provided for the main generator, consisting of a water resistance in a tank, which itself forms a negative electrode. Adjustment of the load from zero to the equivalent of 650 b.h.p. is accomplished remotely from the test berth by means of a motor-controlled positive electrode located in the tank.

CONTRIBUTION OF RESEARCH TO BRITISH RECOVERY.—Speaking at a Press Conference in Melbourne on August 19, Sir Frederick Bain, President of the Federation of British Industries, said that what was being done at present in industrial development, scientific research, and new production would restore Great Britain to its former strong industrial position after two or three years of increasing difficulty. The present situation was so serious that serious remedies were necessary, and if the Government used its new powers with wisdom, courage, and a desire to serve the national interest only, the country as a whole would give its support to whatever action was taken.

Rail-Guided Vehicles on Concrete Track

A novel form of railway with a 3-ft. concrete track and central mono-rail to guide rubber-tyred vehicles



End view of Guideways vehicle, showing the smooth concrete track, guide rail, and rollers

AT Khambalia, a village in Jamnagar State on the Kathiawar Peninsula in western India, an apparently successful attempt has been made to solve the feeder-line problem by constructing a nine-mile Guideways track carrying pneumatic-tyred passenger and goods vehicles. The track consists of a continuous lime-concrete slab, 3 ft. wide and 6 in. to 9 in. deep, surfaced with cement plaster and having a central guide rail to prevent vehicles leaving the track.

The Guideways track is laid on embankments 7 ft. wide between shoulders, in cuttings of corresponding width, and on bridges 4 ft. wide. The rail is secured to the concrete by spikes and the bridges and viaducts are masonry arch structures with circular piers. It is claimed that future lines constructed in mountainous country would take the form of a continuous wall with frequent drainage openings; this would not disturb the hillside and, therefore, would not induce slips or landslides, especially as the rubber-tyred trains cause a minimum of vibration.

Great economy is claimed for Guideways, both in prime cost and maintenance, as there are no sleepers and only a single rail, which may be second-hand and of light section; and formation and bridgework are cheap.

There is practically no maintenance; one man patrols a four-mile length, sweeping the track clear of sand and stones.

Rolling-Stock Dimensions

The rolling stock can be used on a metalled road for railhead work, as well as on the track. Its overall width is 7 ft., and the gauge between centres of the pneumatic tyres is about 2 ft. 1 in., dimensions that correspond closely to the Indian 2-ft. gauge railway standards, which are 7 ft. 6 in. and 2 ft. The general arrangement is shown in the illustration below. The only standard size of tyre available to the promoters of the Khambalia project was 30 in. × 5 in., and consequently the floors had to be abnormally high. This has not adversely affected stability, which is increased in the 12-wheel bogie wagons by the provision of a central well; special orders are also issued to secure uniform loading.

Stability of Vehicles

It is claimed, further, that there is no fear of capsizing—even in the case of wagons loaded to tyre-carrying capacity—when a tyre bursts, as there are still five others on each six-wheel bogie or vehicle to carry the load, and the vehicle remains stable no matter which tyre bursts. Actually, a burst occurred within a mile of the beginning of a run, but the train proceeded to its destination without changing the tyre or any trouble. Tyres have to be kept very tight, and a special type has been ordered by the Khambalia line from the Dunlop Rubber Co. Ltd., capable of standing up to a pressure of 100 lb. per sq. in.

The gross load of a Guideways vehicle is governed by the carrying capacity of its tyres. A 12-wheel bogie wagon with 24-in. × 7-in. tyres, each with a capacity of 2,500 lb., or 30,000 lb. in aggregate, can carry a paying load of about 11 tons. Future policy is to build no more rigid six-wheel wagons, but to concentrate on 12-wheel bogies and a few four-wheel trollies, probably with solid tyres.

One of the six-wheel vehicles has been used for some time to carry cement over a macadam road with ruts and potholes, and has given no trouble. A single-lift method is employed to transfer loaded and empty wagons from Guideways track to road and *vice versa*.

Diesel Motive Power

The locomotive on the Khambalia line is diesel-driven, weighs 4 tons, and has eight pneumatic tyres. It is said to have a haulage capacity equal to that of a normal railway locomotive eight times as heavy.

Guideways track and rolling stock are designed by Mr. Clifford Skelton, a 70-year-old retired railway engineer, who saw 50 years' service in India. They are his solution to the problem of country transport in areas where railways cannot be justified financially, and metalled roads, with their high maintenance costs, are also out of the question. It is claimed that the Guideways system combines the most useful and economic features of both road and rail transport. (See also illustrations on p. 238).

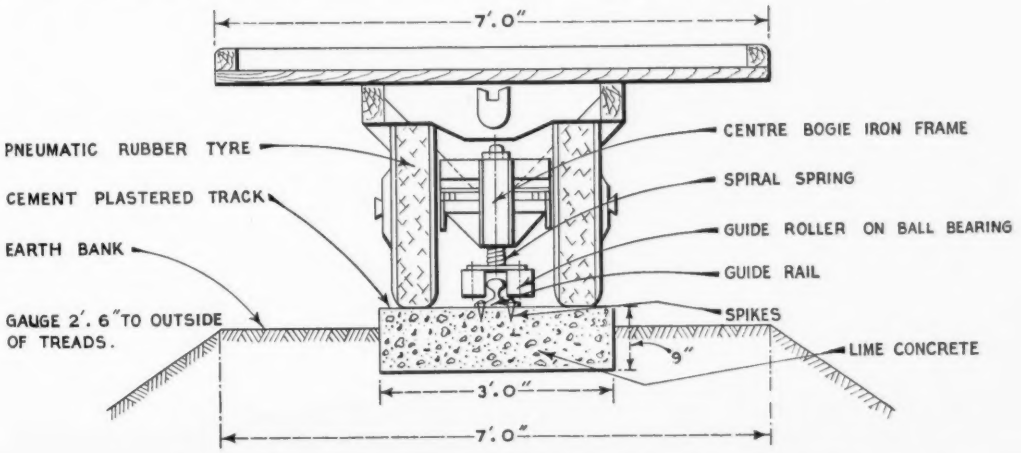


Diagram showing a cross-section of track and end elevation of flat wagon

Rail-Guided Vehicles on Concrete Track

(*See article on page* 237)

A stretch of Guideways track in India

Train of goods and passenger vehicles, hauled by diesel locomotive, crossing a stone viaduct in Kathiawar. Note the pneumatic tyres

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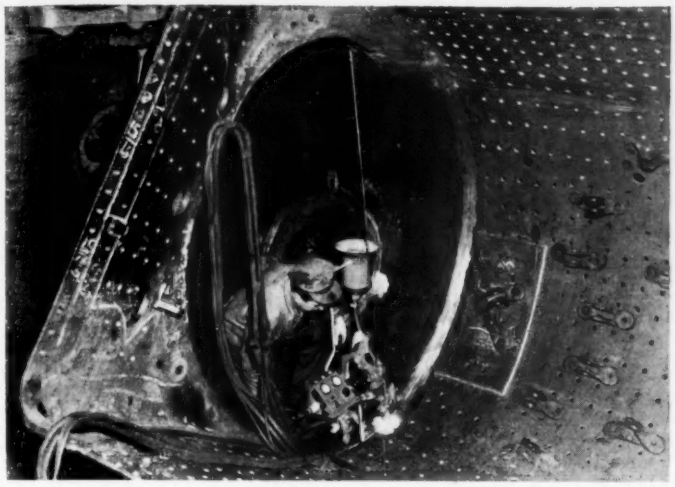
L.M.S.R. GOLF COMPETITION.—Mr. A. E. Garner, L.M.S.R. ticket printer, of Euston, is the only one of the 17 finalists for the forthcoming Rowlandson Cup Golf Competition who has ever reached the final before. Last year, he won third prize, and in all has appeared in four finals. There were 256 entries for the 1947 competition, which will be played on Hillside Golf Course, Southport, on September 15, and among the finalists are a signalman, goods agent, lengthman, ganger, and a fireman.

NEW SHIP FOR TRANSPORT OF LOCOMOTIVES.—The ss. *Christen Smith*, built in Norway to the order of the Belships Co. Ltd., Skibo A/S, of Oslo, underwent a successful acceptance trial on July 3. This ship has been designed specially for carrying fully-erected locomotives and tenders, and other heavy-lift cargoes, and is fitted with three large derricks. Two of these are of 100-tons capacity, and the third, with a capacity of 200 tons, is the largest ever installed in a cargo ship.

IRON ORE BY SPECIAL G.W.R. TRAINS.—The G.W.R. is to run three special trains daily from Banbury to Bilston with iron ore for use in blast furnaces which have been closed down for some time. Some 3,000 tons will be carried weekly.

All-Welded Locomotive Boiler Construction, Canadian Pacific Railway

A method of construction intended to eliminate some of the undesirable features and consequences of the conventional type of boiler



Welding third ring to wrapper sheet and throat sheet

SINCE the early part of 1946, two locomotives with welded boilers have been in operation on the Canadian Pacific Railway, where they have been working between Montreal and Toronto, and Winnipeg and Regina. Their performance is being watched carefully, as it is hoped that these two engines may pioneer the way for a new technique in boiler construction on the C.P.R.

Object of the New Technique

As part of the general policy of adopting, wherever practicable, the latest methods in solving transportation problems, it is hoped that the new fusion-welded boilers will eliminate or reduce considerably some of the undesirable features of the usual riveted type of locomotive boiler. The new constructional technique will, it is hoped:—

(1) Eliminate cracks due to intergranular corrosion and high stress concentration in rivet holes.

(2) Increase joint efficiency, as compared with riveting.

(3) Reduce weight by the elimination of lap joints, inside and outside welts, and rivets.

(4) Eliminate the possibilities of age-hardening of cold-worked plates by final thermal stress-relief heat treatment.

(5) Eliminate high stresses round rivet holes due to riveting operations.

(6) Eliminate "stress raisers" due to abrupt changes in section, such as the excess thickness at circumferential and longitudinal seams of the riveted boiler.

(7) With the more uniform contour of the interior and exterior of the welded boiler, permit ease of application of brackets and facilitate cleaning the interior, due to the absence of welts and rivet heads.

(8) Eliminate damage due to caulking of rivets and joints in the riveted construction.

(9) Result in a more economical method of fabricating.

Work carried out by the Mechanical Engineering Department of the C.P.R. resulted in the fitting by the Montreal Locomotive Company of two new "120" class engines of 4-6-2 wheel arrangement with the new boilers, built by the American Locomotive Company, Schenectady, N.Y., and the delivery of the first locomotive with the welded boiler, No. 1216, was recorded in our issue of March 8, 1946. They are the first locomotives of this type to operate on Canadian lines, and are being run in regular service under varying operating conditions.

Decision to try them was prompted by the good service obtained from fusion welding in other instances, including a welded-boiler locomotive now in service on the Delaware & Hudson Railroad. Permission of the Board of Transport Commissioners of Canada was necessary for the installation of the boilers.

The boilers were built to operate at a working pressure of 250 lb. per sq. in., with a factor of safety of 5, and an allowable joint efficiency of 90 per cent. They differ from the Delaware & Hudson boiler in that the barrel portion consists of three barrel courses butt-welded together, and that a manhole opening is provided in the third course to facilitate internal inspection, in place of the conventional steam dome. The foundation rings are of cast steel with single-rivet construction, and the caulking edges of the inside and outside firebox sheets are seal-welded.

General Working Details

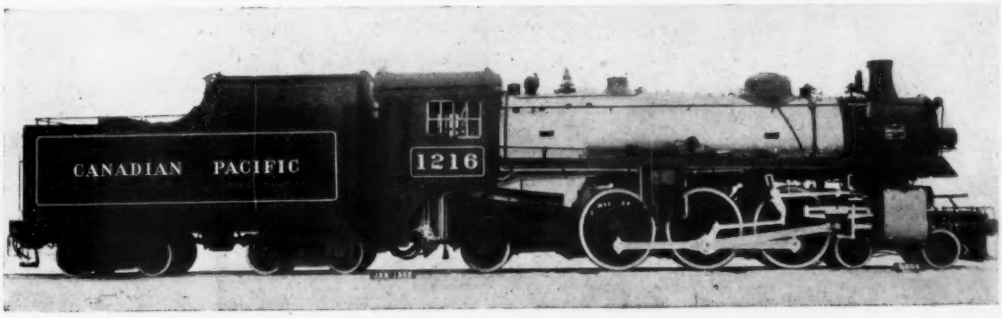
The smokebox is fastened to the first course by riveting, to facilitate its renewal, which is necessary three to four times during the life of a locomotive boiler. The wrapper sheet consists of a three-plate construction which permits the use of a heavier sheet over the crown, thus eliminating the need for a liner, which is generally used to stiffen the crown of one-piece wrapper sheets.

The manhole is flanged from 1 in. plate and has a 17 in. dia. opening, with an overall diameter of 34½ in., fitted into the third course and attached with double-welded butt-weld. The boiler shell opening at the manhole is reinforced with a liner 1⅛ in. thick, 25 in. inside diameter by 40 in. outside diameter, which is attached to the manhole flange and boiler shell by fillet welds at the inside and outside edges of the liner.

"Pads" for the top-feed clack valves, the washout opening, the bracket attachments for dry-steam pipes, and other internal and external fittings are fillet-welded to the boiler shells prior to the stress-relieving heat-treatment. All washout-plug bushings and flexible staybolt sleeves are seal-welded to the backhead, wrapper sheet, and throat sheet after the boiler has been stress-relieved.

The firedoor opening is formed in the usual manner by flanging the outside back head inward and the inside back head outward. The two edges are joined together by a single-welded butt-weld.

The front tube sheet is of the same design as that used in the Delaware & Hudson all-welded boiler. It consists of a circular ring 1½ in. thick by 4⅜ in. wide, with a recess at the water side in which the tube sheet is fitted and fillet-welded both sides. The complete tube-sheet assembly is then fitted and fillet welded to the first course. The ring is provided with slots at the top and bottom centres in order that the tube sheet can be renewed without cutting any of the welds except those directly attaching the tube sheet to the circular ring.



A new "120" class locomotive of the C.P.R. fitted with welded boiler

Plates used in the boiler shells were carbon steel to the American Society for Testing Materials Specification A-201, Grade A, "killed" for automatic submerged melt welding. The inside firebox sheets were carbon-steel firebox quality to the railway company's specification No. 5.

Joint Preparation

The circumferential and longitudinal seams of the barrel rings were prepared for automatic submerged melt-welding on a plate planer prior to rolling and forming. The inside and outside back head, throat sheet, back tube sheet, and firedoor hole were prepared for manual welding by chipping and grinding. A tolerance of 0·015 in. was permitted in the gap between the plate edges which were welded by the automatic submerged melt process and a gap of $\frac{1}{4}$ in. between joints welded manually. To obtain the tolerance required for automatic welding it was found necessary to grind the butting faces prior to pulling them together.

Large nuts were tack-welded to each side of the seams inside the boiler, through which draw bolts were applied to hold the seams in line and for pulling the butting edges together. After each seam was properly lined up, the plates were tack-welded on the inside to maintain a good fit during welding on the outside. "Clean-up" grinding of the plate edges also was carried out to remove all dirt and scale which might have otherwise caused defects in the weld metal. After the outside welds were completed, the draw bolts, nuts, and tack welds were removed and the inside of the seam made ready for welding.

Welding Procedure

All welding was in accordance with the A.S.M.E. Locomotive Boiler Code. Procedure qualification and operator's qualification tests were made to determine the suitability of the welding technique employed, welding apparatus, electrodes, plate material, and welding operator's ability to produce sound welds under conditions similar to those used during erection of the boilers. The procedure qualification tests consisted of welding joints similar to those required for erection of the boilers, using the welding and rotating equipment employed during construction. A record of all qualification tests was kept for future reference.

The automatic submerged melt-welding process was used to weld all longitudinal and circumferential seams wherever practical. Test plates were attached to the longitudinal seams of each barrel course and welded continuously with the seam.

Identification marks were attached to each test plate so that they could be identified in relation to the ring from which they were taken. Test plates were stress-relieved with the boilers and then given the physical test required. Physical test applied to the test coupons showed the joint to be superior to the parent metal in all cases.

The total lengths of fillet and butt-welds required were:—

Fillet Welds				
$\frac{1}{4}$ in.	...	658 in.	...	(54 ft. 10 in.)
$\frac{3}{8}$ in.	...	713 in.	...	(59 ft. 5 in.)
$\frac{1}{2}$ in.	...	730 in.	...	(62 ft. 6 in.)
$\frac{5}{8}$ in.	...	318 in.	...	(26 ft. 6 in.)
Butt Welds				
$\frac{3}{8}$ in.	...	586 in.	...	(48 ft. 10 in.)
$\frac{1}{4}$ in.	...	206 in.	...	(17 ft. 2 in.)
$\frac{7}{32}$ in.	...	113 in.	...	(9 ft. 5 in.)
25/32 in.	...	299 in.	...	(24 ft. 1 in.)
27/32 in.	...	775 in.	...	(64 ft. 7 in.)

All fillet welds and a small percentage of the irregular butt welds were made with the manual arc using American Welding Society (A.W.S.) "E-6011" electrodes. X-ray examination was carried out in accordance with the A.S.M.E. Locomotive Boiler Code requirements.

For ease in locating possible defects, lead numbers were attached to a cloth strip at 2 in. intervals. The cloth was then attached to the boiler, close enough to the weld to enable the lead numbers to show up on a 4½ in. x 17 in. X-ray negative. The numbers started at the front of each longitudinal seam and at the front longitudinal seam running counter-clockwise when X-raying the girth seams. Light centre-punch marks also were made alongside each seam at 10 in. intervals, to which lead arrows pointed, serving as a permanent means of locating defects.

When, for example, a defect was found on an X-ray negative, the negative itself was placed on the boiler and positioned exactly by placing the centre punch marks on the negative over those on the boiler, thereby eliminating any possible mistakes in locating defects.

Stress-Relieving Heat-Treatment

The American Locomotive Company installed in 1945 at its Schenectady plant, a wagon-bottom indirect-heating stress-relieving furnace, which is fully automatic on its heating, soaking, and cooling cycles. Before placing a boiler in the stress-relieving furnace, the foundation ring was bolted in place and the back head, wrapper sheet, throat sheet, and boiler shell thoroughly braced to prevent distortion. After the boiler was mounted on the furnace base, thermocouples were attached at various locations of the boiler for control of heat input to the light and heavy sections during the stress-relieving operation.

The stress-relieving temperature was raised 100° F. per hour until a maximum temperature of 1,175° F. was reached; the furnace was held at this temperature for 2½ hours and cooled 100° per hour until a furnace temperature of 200° F. was reached before the boiler was removed from the furnace. The stress-relieving heat-treatment was accomplished without any change in contour.

After the stress-relieving heat treatment, the firebox, staybolts, flexible staybolts, tube, flues, stay rods, and other internal fittings were assembled.

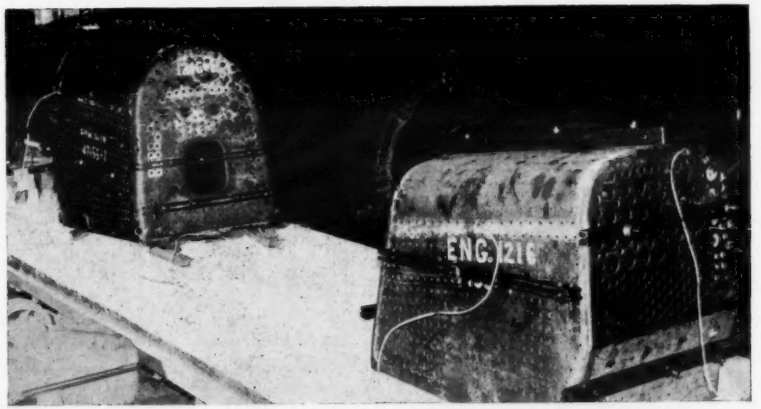
The boilers were hydrostatically tested to 1½ times the maximum allowable working pressure, and while under this pressure all unstayed seams were hammer-tested by striking each side of the seams at 6-in. intervals. The boilers then were given the usual final steam test for locomotive boilers.

American-Built Streamline Locomotive for India

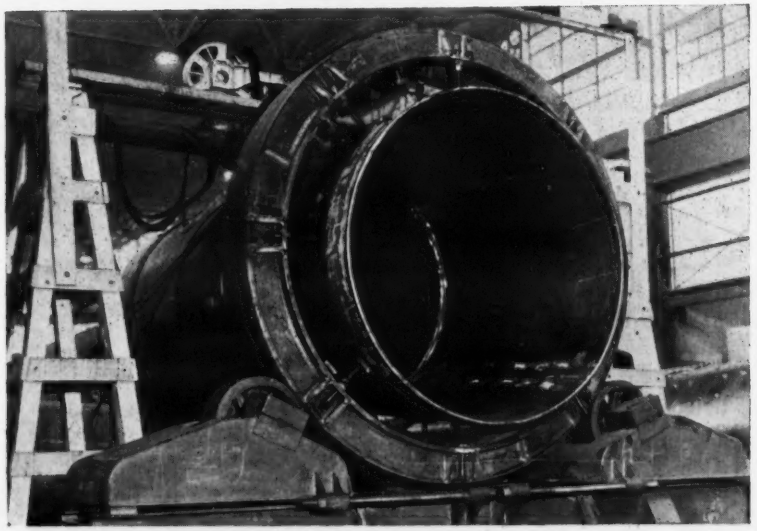
Representatives of the Government of India at the ceremony in Philadelphia, of handing over the first of 16 *streamline locomotives being built by the Baldwin Locomotive Works for Indian railways. The locomotive is named "The Spirit of New India"*

An All-Welded Locomotive Boiler, C.P.R.

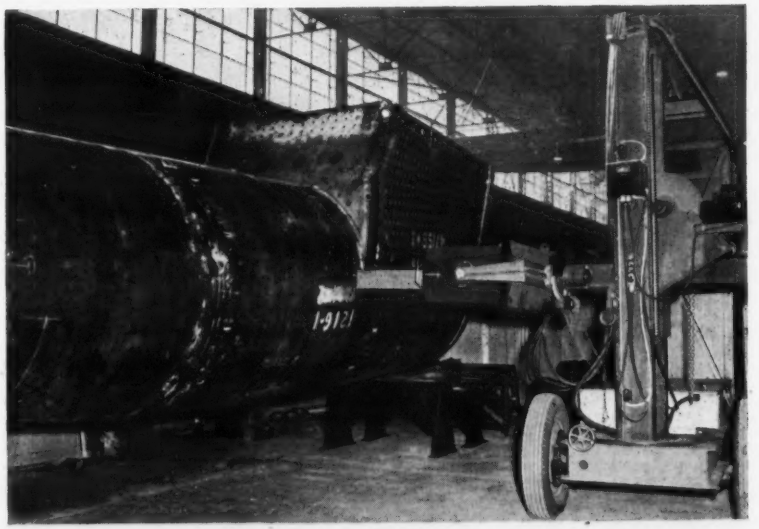
Preparation of longitudinal seam



Boiler ready for stress relief



Welding outside of circumferential seam between first and second rings and large compensating auxiliary ring



Boiler seams undergoing X-ray examination at the workshops of the Montreal Locomotive Company

A One-Man Petrol Shunter

Jack attachment for coupling purposes serves also for transferring the machine to and from the track

THE petrol shunter illustrated has been designed by the Société Parisienne de Mécanique Jami, of 15, Rue Paul-Vaillant-Couturier, Levallois-Perret (Seine), for dealing with wagons in private sidings, small goods yards, and other situations where the use of a shunting locomotive is uneconomical. The device consists of a tractor chassis provided with flanged wheels for running on standard or narrow-gauge track, and driven by a detachable power unit comprising a 10-h.p. petrol engine, with the associated controls.

Lateral Movement

A jack is mounted on the chassis in such a way as to have lateral movement, so that the attachment at the top of the jack which engages with the coupling hook on the wagon can adjust itself when traversing curves. The jack is operated by a hand lever, and is elevated so that, when the tractor is coupled to a wagon, a part of the weight of the wagon is transmitted to the tractor wheels in order to increase adhesion.

Another important function of the jack is to enable the tractor to be raised when it is necessary to lift it off the track. For this purpose a plate is fitted at the lower end of the jack screw. The plate can be screwed down so as to rest on a sleeper or other suitable support, when it will take the weight of the chassis, permitting rotation through a quarter-turn so as to remove the tractor from the metals by lowering it on to suitable planks or other form of support. The plate is located in such a way that the tractor is in balance when supported by it, and the whole operation of removing it from, or setting it on, the track can be performed by one man. A similar procedure enables the tractor to be transferred to another track at a cross-over.

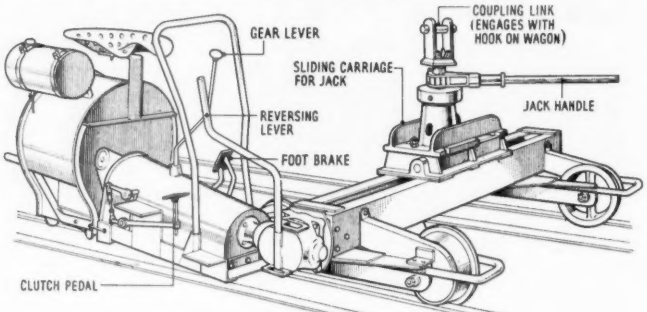
Engine and Transmission

Power is supplied by a 10-h.p. air-cooled petrol engine, coupled to a three-speed gearbox and driving a transverse shaft through reduction gearing, with a reversing mechanism.

The drive is transmitted to all four wheels by means of chains, and three speeds are provided, for operation at between 1 and 6 km.p.h. Braking is by pedal control to all four wheels. The transmission mechanism is actuated by a clutch pedal, a change-speed lever, and a reversing lever. The driving assembly, consisting of the engine, transmission, driver's seat, and controls, is constructed as a separate unit, attached to one end of the chassis. A counterweight at the other end maintains equilibrium.

The machine is known as the Lorry-Tracteur, and is applicable for haulage duties inside factories and elsewhere as well as on railway lines. It is of simple and robust construction, and it is claimed that it can be operated successfully by a driver after only a few hours' instruction.

The tractor is guaranteed to haul or propel a load of 40 tons, comprising one or several wagons. This load can be increased on tracks in good condition.



Details of the Lorry-Tracteur construction and controls

STEEL TUBES AND TUBULARS.—The British Standards Institution has recently issued B.S. No. 1387:1947, for steel tubes and tubulars suitable for screwing to B.S. 21 pipe threads. It supersedes the pre-war B.S. 789 and the war emergency B.S. 789A. Copies may be obtained on application to the Publications Sales Department, 24, Victoria Street, London, S.W.1, price 2s. 6d., post free.

SUPPLY OF EQUIPMENT FOR OIL-FUEL CONVERSIONS.—The Ministry of Supply has issued an explanation of the division of functions in relation to the provision of equipment for coal-oil conversion of railway locomotives. Contracts for the supply of equipment required by the railways for locomotives and for oil storage installations are placed by the Ministry. The erection and fitting of the equipment is carried out by the railway companies. The Ministry of Transport is the co-ordinating planning department for all matters concerned with coil-oil conversions on railways. Close contact is maintained by the Ministry of Supply with the Railway Executive Committee and the Ministry of Transport. Similar explanations have been issued relating to heavy electrical plant and coal mining machinery, in consequence of inquiries received by the Ministry which indicate that the division of responsibilities is not clearly understood.

NEW ESCALATOR AT BANK STATION.—A new escalator at Bank Station, on the London Transport Central line, came into operation on August 25. This additional escalator, 103 ft. long and 51½ ft. deep, making a total of three at one of the most heavily used stations on the Underground, will improve travel conditions by speeding the flow of traffic. It is situated between the two existing escalators, is reversible, and will run upwards during the morning peak, and downwards during the evening peak. The three pre-war escalators were destroyed when a bomb was dropped on the station in January, 1941.

BELFAST-DUBLIN NON-STOP EXPRESS.—A train of seven new vehicles, called the "Enterprise," was inaugurated by the G.N.R.(I.) between Belfast and Dublin on August 11. The train leaves Belfast at 10.30 a.m. and Dublin at 5.30 p.m., making the journey of 112¼ miles in both directions in 2¼ hours. Special arrangements have been made for customs examination at Belfast and Dublin to obviate a stop at the border. Accommodation is limited to the seating capacity of the train, which comprises 72 first-class and 200 third-class seats.

RAILWAY NEWS SECTION

PERSONAL

L.M.S.R. Acting President

Consequent on the appointment of Sir William Wood, K.B.E., President of the L.M.S.R., to the British Transport Commission, Mr. G. L. Darbyshire, C.B.E., has been appointed Acting President of the L.M.S.R.

Mr. W. H. Victory, General Assistant to the Chief Docks Manager, Great Western Railway, retired on August 21.

Mr. J. C. Martin, Tunnelling Assistant to the Chief Engineer, L.P.T.B., retired on August 20.

Mr. D. H. Carlisle has resigned from the board of the Bolivar Railway Co. Ltd.

Mr. W. M. Neal, Chairman & President of the Canadian Pacific Railway Company, has been made a Freeman of the City of Vancouver.

The late Mr. Stanhope Forbes, R.A., who designed several well-known posters for the L.M.S.R., and was a son of the late Mr. William Forbes (at one time Manager, Midland Great Western Railway, Ireland) and brother of the late Sir William de Guise Forbes (General Manager, L.B.S.C.R., 1899-1923), left £24,328.

Sir Geoffrey Peto and Mr. C. W. Speirs have retired from the board of the Morgan Crucible Co. Ltd. Mr. J. Walker, a senior member of the technical staff, has been appointed a Director.

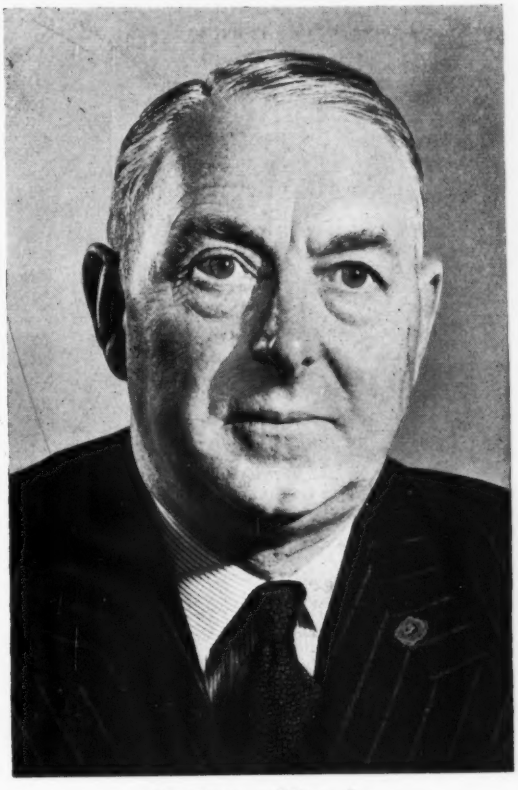
We regret to record the death on August 23 of Mr. Andrew Jollie, a Director of the United Steel Cos. Ltd.

The King has awarded the Imperial Service Medal to 153 employees of the Department of Transport, Canada.

British Electricity Authority

The Minister of Fuel & Power has made the following appointments to the British Electricity Authority:—Chairman, Lord Citrine; Deputy-Chairmen, Sir Henry Self and Mr. J. Hacking; Members, Mr. E. W. Bussey, Dame Caroline Haslett, Alderman Sir William Walker, Lt.-Colonel E. H. E. Woodward and Mr. T. Johnston (*ex officio*, as Chairman, North of Scotland Hydro-Electric Board). In accordance with the provisions of the Electricity Act requiring four of the chairmen of area boards to serve in rotation on the central authority, the Minister, after consulting the British Electricity Authority, has invited the following to be Chairmen-designate of the area boards indicated and in that capacity to serve on the British Electricity Authority as soon as those area boards have been constituted:—Mr. J. Eccles (Merseyside & North Wales), Alderman W. Lewis (Midland), Mr. J. S. Pickles (South-West Scotland), Mr. H. J. Randall (London).

Sir Eustace Missenden, O.B.E., M.Inst.T., who, as recorded in our August 22 issue, has been appointed Chairman of the Railway Executive under the British Transport Commission, is General Manager of the Southern Railway. He entered the service of the South Eastern Railway in 1899, and, after several years' experience in station working, he was transferred to the Office of the Superintendent of the Line in 1906. In 1912 he was appointed Assistant to the District Superintendent, Eastern Division, and in 1914 was transferred as Assistant to the London District Traffic Superintendent; and, after acting as London District Superintendent during 1919, he was appointed London District Traffic Superintendent in 1920. On the grouping in 1923 he became London (East) Divisional Operating Superintendent, Southern Railway, and he was appointed Assistant Superintendent of Operation in 1930. In 1933 he became Docks & Marine Manager. In 1936 he was appointed Traffic Manager, a position he continued to hold after he had assumed, at the outbreak of war, the responsibilities of General Manager, in the absence of Mr. Gilbert Szlumper on Government service. Sir Eustace Missenden was appointed substantive General Manager as from April, 1942. He received the honour of knighthood in the King's Birthday Honours, 1944. He is Chairman of the General Managers' Conference, Railway Clearing House, for 1947.



Sir Eustace Missenden

Appointed Chairman of the Railway Executive under the British Transport Commission

Canadian Pacific Railway

Administrative changes in the operational control of the Canadian Pacific Railway have been announced. The previously-existing division into Eastern and Western Lines has been superseded by the creation of three regions: Eastern, Prairie and Pacific. The last will be under the control of a newly-created Vice-President, Mr. G. H. Baillie, formerly General Manager Western Lines, who, with headquarters at Vancouver, will have jurisdiction over railway lines, coastal steamships and related services. Mr. W. A. Mather, formerly Vice-President, Western Lines, becomes Vice-President, Prairie Region, and Mr. N. R. Crump, Vice-President & General Manager, Eastern Lines, becomes Vice-President, Eastern Region. Other appointments include those of Mr. D. S. Thomson, Assistant General Manager, Eastern Lines, as General Manager, Eastern Region; Mr. J. I. Mackay, General Superintendent, Manitoba District, as General Manager, Prairie Region; and Mr. E. S. McCracken, General Superintendent, Algoma District, as General Superintendent, Pacific Region.

Sir Francis Joseph has resigned from the board of the Birmingham Small Arms Co. Ltd.

When the Swedish Iron & Steel Institute in Stockholm celebrates its 200th anniversary in September, Dr. Magnus Tigerschiöld, Chief of the Technical Bureau, is to be presented with the Bessemer Gold Medal by the British Iron & Steel Institute.

Among decorations conferred by the Queen of the Netherlands, for the wearing of which the King has granted unrestricted permission, is that of Knight Officer of the Order of Orange Nassau with Swords, on Lt.-Colonel (temporary) John Ronald Sainsbury, R.E. (lately Resident Assistant Engineer, Newport Docks, Great Western Railway, and now Resident Engineer, North & South Shields Docks, Tyne Improvement Commission).

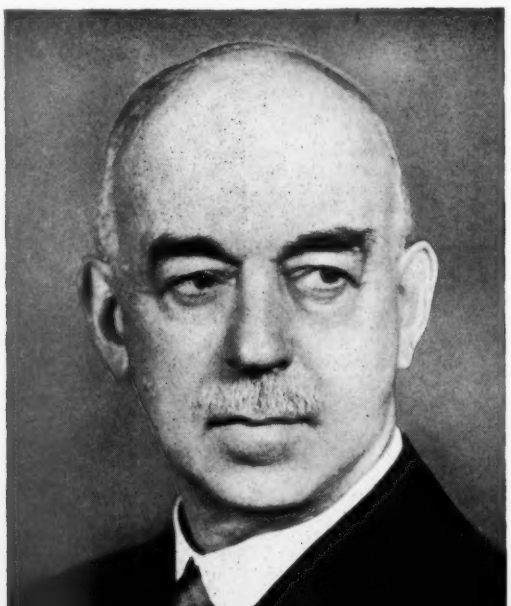
Mr. S. Barter, Assistant for New Works & Rules & Regulations to the Traffic Manager, Southern Railway, who, as recorded in our June 27 issue, has retired, joined the L.S.W.R. at Plymouth (Friary) in 1900. In 1901 he was transferred to the Rules & Regulations & Signalling Department at Waterloo; in 1912 he became Chief of that department, and in 1919 was promoted Outdoor General Assistant. On the amalgamation in 1923 he was appointed Assistant for Rules & Regulations, when he was immediately engaged on the task of standardising the company's regulations for double and single lines. In 1936 Mr. Barter assumed control of the Traffic Manager's New Works Section, in addition to the Rules Section, and thereafter was responsible on behalf of the Traffic Department for comprehensive

schemes of new works connected with extended electrification and the further development of colour light signalling installations. From 1912 until 1935 Mr. Barter was a member of the R.C.H. Special Committee (Rules & Regulations), and was Chairman on several occasions.

Lord Latham, J.P., F.L.A.A., F.C.I.S., who, as recorded in our August 22 issue, has been appointed Chairman of the London Transport Executive under the British Transport Commission, has been a member of the London Passenger Transport Board since 1935. Charles Latham, first Baron Latham of Hendon, who was raised to the peerage in 1942, was trained as an accountant. He was an Alderman of the London County Council from 1928 to 1934, L.C.C. Representative for South Hackney from 1934 to 1946, and has been an Alderman since 1946. In 1934 he became the first Labour Chairman of the Finance Committee of the L.C.C., a post he retained until June, 1940, when he succeeded Mr. Herbert Morrison as Leader of the Council. Lord Latham retired as Leader of the L.C.C. at the end of last July. He will not be resigning his Aldermanship at the present time; but he will be relinquishing all his company directorships. Lord Latham is Lord Lieutenant of Middlesex. He is a former President of the National Union of Clerks, and has served on a number of public bodies, including the Public Works Loan Board (1930-46) and the Economy Committee appointed by the Chancellor of the Exchequer in 1931.

Lord Latham

Appointed Chairman, London Transport Executive, under the British Transport Commission



Mr. C. L. Darbyshire

Appointed Acting President, London Midland & Scottish Railway

SOUTH AFRICAN RAILWAYS & HARBOURS

Mr. E. W. Fordred, Chief Clerk (General), has been appointed Superintendent (Commercial), General Manager's Office, Johannesburg.

Mr. H. G. Bosch, Secretary to the General Manager, Johannesburg, has been appointed Superintendent (Commercial), System Manager's Office, Johannesburg.

Mr. W. G. Reed, Assistant Superintendent (Commercial), System Manager's Office, Johannesburg, has been appointed Superintendent (Commercial), System Manager's Office, Cape Town.

Mr. B. B. Hopkins, Assistant Superintendent (Staff), General Manager's Office, Johannesburg, has been appointed Superintendent (Staff), System Manager's Office, Durban.

Mr. J. E. Connelly, Assistant Superintendent (Staff), General Manager's Office, Johannesburg, has been appointed Superintendent (Staff), System Manager's Office, Pretoria.

Mr. J. E. Bronks, Assistant Superintendent (Staff), General Manager's Office, Johannesburg, has been appointed Superintendent (Commercial & Staff), System Manager's Office, East London.

Mr. H. E. Harris, Assistant Goods Superintendent, Kazerne, has been appointed Superintendent (Commercial & Staff), System Manager's Office, Bloemfontein.

We regret to record the death on August 16, at the age of 62, of Mr. George W. Clarke, specialist on gear and spline grinding with A. C. Wickman Limited since 1938, and previously Works Superintendent with the Gear Grinding Co. Ltd., of Birmingham.

Mr. George L. Darbyshire, C.B.E., M.Inst.T., a Vice-President of the London Midland & Scottish Railway, who, as recorded on page 243, has been appointed Acting President, entered the service of the L.N.W.R. in 1898 in the Traffic Department at Crewe, and in 1910 was appointed Chief Staff Clerk in the Divisional Office at Liverpool. In 1919 he was transferred to the General Manager's Office, Euston, in the Staff Department, and, after the formation of the L.M.S.R., he became Assistant to the Chief Officer for Labour & Establishment; in 1930 he himself was appointed Chief Officer for Labour & Establishment, which position he vacated in 1943 on being appointed a Vice-President. During the recent war, while Chief Officer for Labour & Establishment, L.M.S.R., Mr. Darbyshire was Chairman of the Railways Staff Conference and of the Staff Committee of the Railway Executive Committee. As Chief Officer for Labour & Establishment, his duties covered not only the staff questions affecting a payroll of not far short of a quarter-of-a-million individuals, but also all office arrangements, police, medical, educational and welfare services, and the superannuation funds. Mr. Darbyshire was a member of the Government Committee on Rehabilitation of Persons Injured in Accidents. He was made an O.B.E. in the New Year Honours, 1939, and a C.B.E. in the New Year Honours, 1945.

The G.W.R. Missing Goods Depot

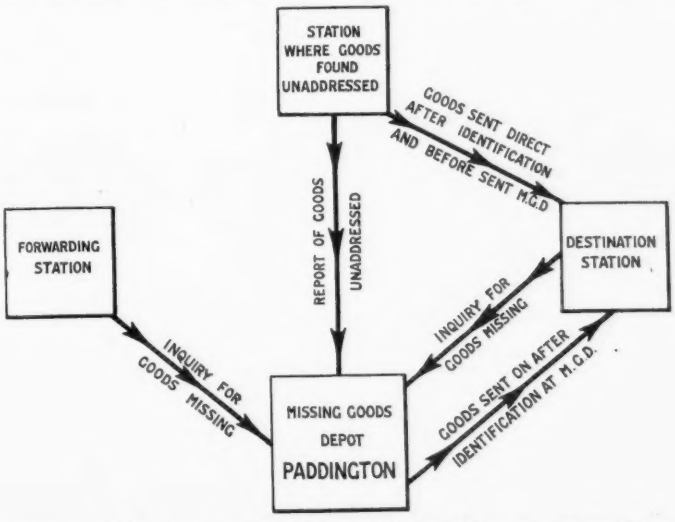
Identifying and delivering consignments which have lost their address labels

It is a regrettable fact that numerous packages are despatched by the trading public without address labels, or with inadequate addresses, or with labels insecurely affixed, and consequently the goods arrive at a station with no means of identification. Failure on the part of senders to obliterate old labels from the packages also causes considerable confusion, and adds to the difficulties of those called on to deliver the consignments to the correct destinations.

In order to point the moral in this connection, the railways issued a striking poster, with the caption "No —— label!," depicting a harassed porter scratching his head over an unaddressed package. Many years ago the G.W.R. found it necessary to institute a scheme whereby these packages finally would reach their correct destinations, and thus the missing or unclaimed goods depot came into being.

The work of the Missing Goods Depot is many-sided, but, briefly, all goods found without address or other identification of ownership are notified to the depot at Paddington by the station holding the goods; a carbon copy of the advice is retained by the station until the goods have been sent forward to their correct destination, when it is despatched to Paddington to be amalgamated with the original advice. Alternatively, if it is necessary for the goods to be sent to the Missing Goods Warehouse at Paddington, this carbon copy is used as the invoice, and on receipt at Paddington is kept with the original advice.

The accompanying diagram illustrates the procedure in dealing with goods found without address, and inquiries for missing goods.


STATION WHERE GOODS FOUND UNADDRESSED
GOODS SENT DIRECT AFTER IDENTIFICATION AND BEFORE SENT M.G.D.
REPORT OF GOODS UNADDRESSED
FORWARDING STATION
DESTINATION STATION
INQUIRY FOR GOODS MISSING
INQUIRY FOR GOODS MISSING
GOODS SENT ON AFTER IDENTIFICATION AT M.G.D.
MISSING GOODS DEPOT PADDINGTON

Functions of the depot in identifying and forwarding unaddressed goods

The methods employed in the Missing Goods Depot fall mainly under two distinct heads. First, the details in the initial advice, consisting of all marks, dimensions, description of contents, and a sketch of the article if it is unusual or not easily described, are entered into registers according to the commodity. Thus it is possible for inquiries from stations, where goods are expected but have not been received, to be dealt with direct from the advice, and the goods often can be identified from the book record without recourse to inspection of the goods themselves.

The second aspect of the work is of a physical kind. When the goods are received into the Missing Goods Depot, they are checked with the details on the form, and every package is recorded, and specially labelled and numbered progressively; it is carefully examined, inside and out, and the contents noted. The sketches recorded in the register of articles of unusual shapes are invaluable, as are the branded number of manufacturer, record of maker's test marks, and so on. Every possible clue to ownership is followed up, the register being particularly useful in identification, and often providing further evidence.

Members of the staff employed on the work, by virtue of their very long experience, have become specialists in identifying the wide range of goods which they are called on to handle. Expert assistance is obtained also, where necessary, from the various trade associations.

Storage in the Central Warehouse is so arranged that the goods received are stored as nearly as possible according to their classification in the register; that is, goods of a similar type such as bales, nuts and bolts, iron and steel, and so on, are stored in allotted areas, clearly indicated, and the progressively-numbered labels make it relatively easy for any article or package to be located when required.

The organisation has proved most effective in practice, and is one more of the little-known specialist arrangements by which human error is corrected, satisfaction given, and the standard of service of the G.W.R. upheld.

Radio Telephone Service on U.S.A. Trains

For the first time in the United States, passengers on certain trains of the Pennsylvania Railroad, and the Baltimore & Ohio Railroad, between Washington and New York, now are able to call and receive calls from any telephone connected with the Bell System, as well as telephones in many foreign countries, while the trains are in motion. This pioneer new service was inaugurated on August 15 on an experimental basis.

Telephone service was made available for public use initially on the "Congressional Limited" of the Pennsylvania, and the "Royal Blue" of the B. & O. in both directions between Washington and New York, *via* Baltimore, Wilmington and Philadelphia. On August 22 the service was extended to include the Pennsylvania "Potomac" express from Washington to New York, and "The Legislator" from New York to Washington.

A portion of the lounge car on each train has been re-designed and set aside for the new telephone service, and affords privacy to passengers using it. Attendants are available to assist passengers in making calls, and to locate persons on the train for whom incoming calls are received.

The train passenger's voice is transmitted by radio to the nearest receiving station of the Bell System's mobile telephone service, and thence by landline to the called telephone. In a similar manner, calls can be made to passengers on the train by the reverse of the foregoing process.

The new radio-telephone equipment, which was designed by the Bell Telephone Laboratories, utilises two frequency channels, one for sending and the other for receiving, so that conversations may be carried on in the same way as in a normal telephone call by landline, without the necessity of switching from "transmit" to "receive," which is associated with customary radio-telephone procedure.

Telephone service from the trains concerned is on the same basis as other mobile radio-telephone facilities provided by the Bell System for motor vehicles and other mobile units, and the same rates are applicable. While designed primarily for the use of the public, the new telephone equipment is available also for the staff.

In connection with this new service, it will be recalled that experiments in communication between a moving train and an ordinary telephone system were carried out in Great Britain during the war by the L.N.E.R. The radio link, provided by Marconi medium-wave transmitters, was established between the train and the company's own telephone network *via* Peterborough. A single frequency was used for communication in both directions, the duty of send-receive switching for the correspondents at the fixed station falling on the operator at the Peterborough exchange.

"WHEN THE WHEELS SLOW DOWN."—The national film campaign organised by the Road Haulage Association, in order to bring its film "When the Wheels Slow Down" to the notice of the public, comes to an end this week. It is estimated that during the 15 weeks of the campaign, over two million people have seen the film. In spite of the passing of the Transport Act, public interest in the film continues to be keen. It is reported that at the Newcastle County Agricultural Show on August 21, 22, and 23, over 10,000 people saw the film. One mobile film unit, equipped with a generator, is to be retained by the Association, and in addition copies of the film are being sent to all parts of the country for both public and private exhibition.

Staff and Labour Matters

Payment of Electric Motormen

The Chairman of the Railway Staff National Tribunal has found against a claim by the A.S.L.E.F. and N.U.R. that a motorman working a train to the point where it is to be divided, and being then required as part of his rostered turn to perform the duty of taking over the rear portion of the train and berthing the unit, is entitled to payment for that work in addition to his normal mileage.

The rate of payment in computing mileage is laid down in the national agreements and electric motormen are covered by the mileage arrangements. Where the mileage during any turn of duty exceeds 140 miles, payment is made on the basis of 15 miles being equivalent to 1 hour. Men whose day's work is on the mileage basis, if brought out earlier, or kept out later, for the purpose of piloting, shunting, or to perform work of any description other than mileage, not provided for in the "day's work on the mileage basis" are paid for such time worked, in addition to the day's mileage, in accordance with the regulations governing payment by time, less the usual diagrammed time for engine requirements. All work in connection with trains on the mileage basis is included in the time paid for on the mileage basis; such payment covers all duties actually connected with the preparation and disposal of the man's own engine and train, and also extra time worked due to late arrival. If a man on mileage is called on to perform work, other than that connected with his train, at any intermediate point on his journey, he is paid for such extra duty; but if a man on mileage is kept back for a later train at any intermediate point in his working, he is not paid anything in excess of his mileage rate for time so detained, unless called on to perform any special work during the period of such detention.

A man paid on mileage who finishes the latter part of his day's work travelling passenger, on account of the hours of duty, is paid the mileage rate up to the time he gives up his engine, plus the time for the hours occupied travelling passenger, less any marginal time for the disposal of his engine. In the event of a man finishing his mileage trip at a distance away from his home station, and being employed to work a train to his home station, payment for such work is incorporated in his mileage payment.

UNIONS' AND COMPANIES' CONTENTIONS

It is contended by the unions that, in the case of a train being divided, and the rear portion going elsewhere, the rear portion becomes a second train and is no longer the man's own train for the purposes of the mileage provisions of the national agreements; that the issue now raised relates to the position of a motorman who, after completing his duty, is relieved and called on to detach the rear portion of his train and berth the unit; that the national agreement specifies that payment on a mileage basis covers all duties actually connected with the preparation and disposal of the man's own engine and train and that, accordingly, if the motorman is relieved and is then called on to dispose or berth the rear portion of a train after his own train has been divided, then he is entitled to payment for that in addition to the mileage payment; that in the case of steam trains similar operations involve extra payment; and that the present practice of splitting electric trains may increase.

The railway companies contend that, where the duty which forms the subject of the claim is required to be performed by a motorman, it would in fact be rostered as part of his day's work on the mileage basis; that the national agreements provide that all work connected with trains on the mileage basis is included in the time paid for on the mileage basis and, further, that such payment covers all duties actually connected with the preparation and disposal of the man's own train; that the work of berthing the rear portion of a train which has been divided falls to be dealt with as work connected with the disposal of a man's own train; that a motorman is generally required to work more than one train in the course of a mileage turn, and any preparation, disposal, and shunting work performed in connection with his own train is included in the day's work on a mileage basis; and that there is no ground for the suggestion that the rear portion of the train when detached becomes a second train.

Indian Government Officers' (Retired) Association

This association has been formed to defend the interests of retired European officers of the Central and Provincial Services affected by the changes in India. As a result of a notice inserted in the national press, about 300 officers so far have become members, but the notice probably escaped the attention of the majority of officers affected, as there are more than 1,300 retired members of the services whose interests are vitally concerned. Membership must be largely increased if the association is to carry maximum weight with His Majesty's Government and members of both Houses, so as to ensure that the interests of members of the services do not go by default during forthcoming negotiations. Even when these negotiations are completed, it will still be necessary to maintain a vigilant watch on developments, to take up special cases, and to see that the continued responsibilities of His Majesty's Government towards members of the services are properly carried out.

The objects of the association as defined in the rules are:—

"To watch over the interests of all retired European officers qualified for membership, and to promote such interests by all legitimate means.

To promote, where possible, the interests of officers still in service in India and who are members of the All-India Association of European Government Servants and associations affiliated thereto."

Membership of the Indian Government Officers (Retired) Association is open to the following:—

"Civilian gazetted officers of European birth who have been in the service of the Government of India or any provincial service, whether their appointment to such service lay initially with the Secretary of State for India, the Governor-General in Council, or a Governor in Council, or arose at a later date from the taking over by the Government of India of the control of organisations which formerly and at the date of their initial appointment were under private or company management.

"Also, widows and unmarried daughters of deceased members (whether on the active or retired list at the time of death) provided they are beneficiaries of a superior service family pension fund or similar benevolent fund."

At a general meeting of the association held on June 30, 1947, a committee of nine members was elected. Two of these are:—

Mr. P. H. Maflin, O.B.E., M.C., formerly General Manager of the Nizam's State Railway, and

Mr. B. Moody, formerly Chief Operating Superintendent, N.W.R.; both are officers of the State Railways Service.

The annual subscription to the association is one guinea, or ten shillings for a lady member, which should be paid to the account of the association with the Imperial Bank of India, 25, Old Broad Street, London, E.C.2.

The headquarters of the association is at 119A, Ladbrook Road, London, W.11, and the Honorary Secretary is Mr. J. C. Powell-Price, to whom inquiries may be addressed.

Argentine Railway Schemes Sanctioned[1]

On August 21 the schemes of arrangement between the British-owned railways in Argentina and their stockholders, with reference to the sale of the railways to the Argentine Government, came before Mr. Justice Jenkins in the Vacation Court. Sanction to the schemes was given in the case of all the 10 companies concerned, which are as follow:—

Buenos Ayres Great Southern Railway Co. Ltd.
Bahia-Blanca & North Western Railway Co. Ltd.
Buenos Ayres Western Railway Limited
Buenos Ayres Midland Railway Co. Ltd.
Central Argentine Railway Limited
Buenos Ayres & Pacific Railway Co. Ltd.
Argentine Great Western Railway Co. Ltd.
Villa Maria & Rufino Railway Co. Ltd.
Entre Rios Railways Co. Ltd.
Argentine North Eastern Railway Co. Ltd.

Details of the schemes of arrangement between the companies and the 56 classes of debenture, note, and shareholders were given in our issue of July 18. At a series of meetings beginning on July 24 (see our August 1 issue), the various resolutions were approved by stockholders of the companies concerned.

The sale of the railways has taken effect as from July 1, 1946, since when their operation has been for the account of the Argentine Government. The purchase price, for the railways proper is £135,500,000, and for shares or assets of certain ancillary and auxiliary undertakings an additional £14,500,000 is involved, making a total of £150,000,000. Details of the division of proceeds from the sale were given on page 598 of our June 6 issue.

In sanctioning the schemes, Mr. Justice Jenkins said that there was nothing in them that could be described as unreasonable or unfair to any particular class. Either the schemes had to be approved, or the terms offered by the Argentine Government must be refused, which probably would mean the operation of the railways under political and other difficulties that were likely to be increased rather than diminished. In the circumstances it was proper that the Court should sanction the schemes.

PETITION FOR RE-OPENING OF L.N.E.R. LOWER EDMONTON BRANCH.—A petition for the re-opening of the L.N.E.R. branch from Cheshunt to Lower Edmonton is to be opened by the Federation of Enfield Residents' and Ratepayers' Association. The support of the Enfield District Manufacturers' Association, and the Enfield Chamber of Commerce is being sought. It is claimed that the population of the area has increased greatly since the railway was closed some 20 years ago.

Questions in Parliament

Repair of Locomotives

Lt.-Colonel Granville Sharp (Spen Valley—Lab.) on August 6 asked the Minister of Supply how many of the 237 heavy freight locomotives, built for Government use during the war, and awaiting repair on December 16, 1946, were now in use; and how many were being used by the main-line railway companies.

Mr. J. Wilmot (Minister of Supply), in a written answer, stated that 202 of the 237 locomotives had so far been repaired, and all of them were being used by the main-line railway companies.

Wagon Repairs in South Wales

Mr. D. J. Williams (Neath—Lab.) on August 6 asked the Minister of Transport if he was satisfied that full use was being made of the existing facilities for wagon repairing in South Wales; and if he would consider extending those facilities, in view of the availability of labour in that area.

Mr. Alfred Barnes, in a written answer, stated: Apart from some shortage of skilled labour at certain points the existing facilities for wagon repairs in South Wales are being used to the full. The possibility of extending wagon repairing to other premises where labour is available is under investigation.

Inland Sorting Depots on Railways

Mr. David Jones (The Hartlepools—Lab.) on August 12 asked the Minister of Transport whether any effective use was being made at the present time of the inland sorting depots which had been built on the railways adjacent to the seaports during the war; and whether he would take such steps as were necessary to equip them as wagon repair depots to enable the large number of railway wagons in need of repair to be speedily repaired.

Mr. Alfred Barnes in a written answer stated: The depots at Glasgow and Liverpool are in use for goods in transit to or from the ports or for short-term storage, but the possibility of utilising a damaged shed at the Liverpool depot for wagon repairs is being considered. The depots at Bristol and Cardiff are in use as sea transport stores, and the possibility of releasing some part of this accommodation for wagon repairs is also being investigated.

Rolling Stock for Freight Traffic

Mr. J. A. Sparks (Acton—Lab.) on August 11 asked the Minister of Transport if he would state the number of serviceable locomotives in operation on the four main-line railways and the number of serviceable wagons, including private owners', available for freight traffic, at the nearest convenient date and in 1944 and 1938; and by what percentages did freight tonnage weekly averages in 1947 compare with 1944 and 1938.

Mr. George Strauss (Parliamentary Secretary to the Ministry of Transport): The Minister of Transport is having this information prepared and will arrange for a statement to be circulated in the Official Report as soon as possible.

Mr. Sparks: Is the Parliamentary Secretary aware that railway freight tonnages have dropped by 19 per cent. compared with what they were three years ago, that this has meant a reduced demand for locomotives and railway wagons, and that to that extent the railway transport system has been considerably eased? Is he also aware that an important contributory factor to the transport problem is the present inadequate control of the movement of traffic, which leads to prolonged delays to freight trains and other trains, and thus reduces the efficiency of transport operations? Will the Parliamentary Secretary look into that side of the transport problem?

Mr. Strauss: I can assure Mr. Sparks that these matters are being looked into very carefully indeed to provide the maximum efficiency in transport services in the coming winter.

Mineral and Box Wagons

Mr. J. Baker White (Canterbury—C.) on August 5 asked the Minister of Transport what steps had been taken during the past four months to complete and bring into service partially-completed mineral wagons recently standing at Martin Mill and Gatwick, and to repair box wagons standing on the Maldon West branch line.

Mr. Alfred Barnes, in a written answer, stated: In view of the difficulty experienced by contractors in obtaining delivery of steel plate, arrangements were made for fabricated doors to be manufactured at the railway works at Ashford. This has enabled 50 of the wagons stabled at Martin Mill to be completed. Manufacturers are now producing doors at the rate of 40 sets a week and the Southern Railway Company is helping to assemble them; the 92 wagons stabled at Gatwick have been taken into the works and 75 of them have been completed and released to traffic. The rest are being dealt with as quickly as possible.

With regard to the wagons on the Maldon West branch line, there is at present insufficient capacity in depots to store all wagons awaiting repair, and this branch is used to stable crippled wagons pending repair.

Consultations Between Railway Managements and Staffs

Mr. Edward Davies (Burslem—Lab.) on August 11 asked the Minister of Transport what steps had recently been taken to obtain the maximum consultation and co-operation between management and staff on day-to-day problems on British railways; and with what results.

Mr. George Strauss: Arrangements have been made for meetings, on an area, district, or divisional basis, between representatives of the local departmental committees, the sectional councils, the trade unions and the companies' officers. Difficulties under which the railways are working are discussed and suggestions for dealing with them are considered. It is as yet too early to assess the results but the Minister of Transport is confident that co-operation of this kind between the staff and the management will be of the greatest advantage.

Mr. Davies: Does the Parliamentary Secretary recognise that meetings of this kind are widely welcomed by the staff concerned, and that their use will be invaluable to the transport system and the general economy of the country, if they are fully utilised and the workers brought into consultation on a day-to-day basis?

Mr. Strauss: Yes.

Local Bus and Rail Fares

Mr. Edward Davies (Burslem—Lab.) on August 11 asked the Minister of Transport whether he was aware that, due to the disparity between bus and railway fares, many short-distance trains were lightly loaded; and whether he would arrange a more flexible basis of charges so that in appropriate circumstances reduction in the standard railway fares might be applied.

Mr. George Strauss: Differences in fares are only one of the factors affecting the distribution of traffic between bus and local train services. While there are various types of rail fares designed to meet the needs of different classes of users, including fares below the appropriate standard, local departures from the normal basis of any type of fare create difficulties in relation to other parts of the same railway system. As regards the future system of charges I would refer Mr. Davies to the reply to a question by Mr. C. Osborne (Louth—C.) on July 28.

Mr. Davies: While I appreciate the difficulties of arriving at such an arrangement, may I ask the Parliamentary Secretary if he does not realise that, while there are queues waiting for buses, many short-distance trains are running comparatively lightly loaded; and that it ought not to be an insuperable problem to use both methods of transport in the public interest?

Mr. Strauss: Yes. I appreciate that, but local variations in train fares are very difficult indeed.

The whole problem will, of course, be gone into by the British Transport Commission.

Severn Bridge Scheme

Mr. A. H. E. Molson (High Peak—C.) on August 13 asked the Minister of Transport whether he would state the present position with regard to the Severn Bridge and the Government's intention in the matter.

Mr. Peter Freeman (Newport—Lab.) asked the Minister of Transport whether instructions had been issued to suspend the erection of the Severn Bridge; and, in view of its urgent need for developing transport and trade between Wales and South West England and the continued unemployment in this area, he would give every possible priority to its completion.

Mr. George Strauss (Parliamentary Secretary to the Ministry of Transport): This scheme, together with other major schemes of capital equipment, is under consideration and the Minister of Transport is not at present in a position to make a statement.

Mr. Molson: Are we to understand that it was not under consideration on July 22 when the Order was made?

Mr. Strauss: There is no question of the scheme not being carried out. It is only a question of time. It is a very necessary and desirable scheme in the interests of South Wales.

Mr. George Thomas (Cardiff Central—Lab.): Is the Parliamentary Secretary aware that the Minister of Transport has assured the House that this scheme is part of the rehabilitation of South Wales, and will the Parliamentary Secretary emphasise to the Minister that this scheme should have a very high priority if South Wales is to get back on to its feet?

Mr. Strauss: Yes. The Minister fully agrees with that.

Mr. Freeman: Does not the Parliamentary Secretary also think that this scheme will help to cement the friendship between these two great countries?

Captain Peter Thorneycroft (Monmouth—C.): Would the Minister give a clear answer to this question? Are they going on with the Severn Bridge, or are they not?

Mr. Strauss: I cannot say anything further than what I have already said, namely, that this proposal and other schemes of capital expenditure will be considered very shortly.

Mr. L. J. Callaghan (Cardiff South—Lab.): When the department is reconsidering this scheme, will it bear in mind that there is no point in stopping it while there

is a large reserve of unemployed, unless these men are going into the export trades? Further, will the department also bear in mind that if they do not supply another 10,000 tons of structural steel to South Wales, they will not get the export factories completed anyway, and they will just continue to have unemployment?

Mr. Strauss: Yes. That is one of the factors which we have in mind.

Transport of West African Groundnuts

Sir Ralph Glyn (Abingdon—C.) on August 11 asked the Secretary of State for the Colonies whether he was aware that shortage of rolling stock on the West African railways was preventing the shipment of groundnuts; and whether, before any further development of that type of product was encouraged, he would ensure that the transport arrangements were made such as to ensure the shipment of each year's harvest before the next crop was gathered in.

Mr. A. Creech Jones (Secretary of State for the Colonies) stated in a written answer: The movement of the 1946-47 groundnut crop, which was one of the largest on record, has been engaging my attention and that of the Nigerian Government for some time. Owing to the accumulation of wartime arrears of maintenance, to staff difficulties and to the delay in the delivery of new locomotives, it is estimated that there will be approximately 20 to 25 per cent. of that crop still unrailed at the commencement of the new season in November. Fourteen new locomotives have, however, recently arrived from Canada, and it is hoped that twenty additional Vulcans, originally to be delivered this year but delayed in production due to the fuel crisis, will be in operation in Nigeria early in 1948. By March, 1948, therefore, assuming that some of the present staffing difficulties can also be overcome, the railway should be operating at a rate capable of moving to port within a period of 12 months a larger crop of groundnuts than any yet produced.

Adequate storage exists to provide for the carry-over of the 1946-47 crop, and careful plans are being made to provide cover for the 1947-48 crop, pending its railing to port.

It is not, of course, possible at this stage to estimate the size of the next crop, but the indications are that the railway will be able to move it and, at the same time, to reduce progressively the carry-over of the present crop.

I agree with Sir Ralph Glyn that the aim should be to arrange the shipment of each crop before the next harvest is gathered. Efforts to improve transport arrangements will be energetically pursued until this goal is reached.

Meanwhile I hope that adequate storage can be provided in the Kano area to prevent the loss of any substantial quantities of groundnuts which can be harvested within the next two seasons. The provision of adequate transport will certainly be a very prominent consideration in any plans for increased production, and it was for that reason that the mission which is now completing its examination of long-term plans for increased groundnut production in West Africa includes a transport expert.

BRITISH SURPLUS GOODS FOR POLAND.—Among large quantities of British Government surplus stores which are being shipped to Poland, are 11,000 tons of Everall railway bridging. This material has been sent to Poland by the Ministry of Supply as a gift from the British Government, and is of the same type as was used for building bridges to carry railway traffic across the River Rhine in the closing stages of the war. The remaining items are being made available under the financial agreement concluded a year ago.

NEW L.M.S.R. POSTERS.—"The Day Begins," one of two new Quad Royal posters produced by the L.M.S.R., is illustrated below. It depicts a "Princess Coronation" class locomotive, on the turntable at Willesden Motive Power Depot, where the artist, Mr. Terence Cuneo, made the original sketch. In a second poster, "Beauty Abides, nor suffers Mortal Change," the changes in dress and fashion from the time of the early Briton to the present-day hiker, are shown against a background of changeless British scenic beauty; in this case the artist was Mr. Claude H. Buckle.

A New Poster of the L.M.S.R.

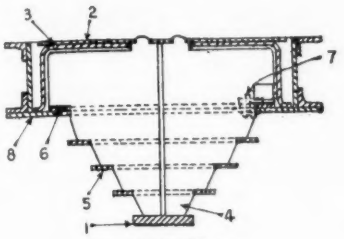
A reproduction of one of a series of new L.M.S.R. posters by Terence Cuneo depicting a "Princess Coronation" class locomotive

ABSTRACTS OF RECENT PATENTS*

No. 576,262. Ventilators

J. L. Musgrave, D. G. Lewis, and Richard Crittall & Co. Ltd., all of Aldwych House, Aldwych, London, W.C.2, and A. V. Bestre, of 29, Sandy Lane, Peterham. (*Application date*: *May* 5, 1944).

A ventilator has a movable part, turned by a knob 1, comprising a perforated plate 2, for co-operation with a fixed perforated

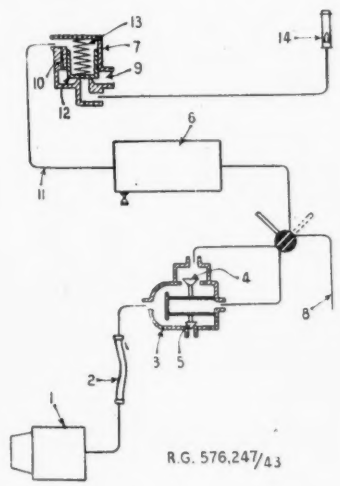


cover 3, and vanes 4 carrying deflecting rings 5. An adjustable ring 6 carries a stop, against which the vanes may abut, at the limits of their movement, and is set by a screw 7 passing through a slot in the main frame 8.

No. 576,247. Locomotive Braking

Westinghouse Brake & Signal Co. Ltd., A. W. Simmons and J. W. G. Kershaw, all of 82, York Way, London, N.1. (*Application date*: *December* 17, 1943).

On a locomotive fitted with pressure type braking, the bogie wheels are braked in addition to the driving wheels. The brake cylinder 1, on the bogie, is con-



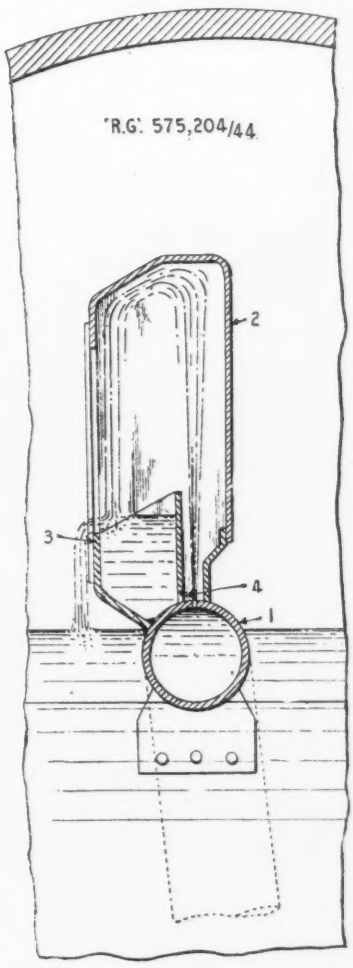
nected through a flexible hose 2 to a control cylinder 3 having inlets and exhaust valves 4, 5 respectively. A supplementary storage cylinder 6 is supplied through a warning valve 7. Pipe 8 communicates with the main brake cylinder, and when the main brakes are applied, the pressure closes the exhaust valve 5 and opens the inlet valve 4, so admitting air from reservoir 6 to the bogie brakes.

When the main brakes are released, valves 4 and 5 close and open respectively, and the bogie brakes are also released. The supply of air to the reservoir 6 enters by port 9, passes through a narrow duct 10 to pipe 11, and, under normal circumstances, the valve plunger 12 is held closed by a spring 13. If, however, a leak occurs in the bogie braking system, the excessive fall in pressure in the pipe 11 allows valve 12 to be raised by pressure in pipe 9 and air passes to a warning whistle 14.

No. 575,204. Water Supply for Boilers

Foster Wheeler Limited, W. Sampson, and R. L. J. Hayden, all of Aldwych House, London, W.C.2. (*Application date*: *March* 4, 1944).

In cases where water is sprayed into a boiler from a feed pipe 1, running along the length of the boiler at approximately



water level, the jets direct the water upwards into a hooded channel member 2 from which it falls into a trough 3 and thence overflows into the boiler. The water thus has time to warm considerably before mixing with the boiler water. When the supply is cut off, the water remaining in the trough runs back through small orifices 4 and floods the top of the pipe, thereby preventing steam entering it and causing hammering.

No. 576,336. Brake Control

Westinghouse Brake & Signal Co. Ltd., of 82, York Way, London, N.1. Communication from Westinghouse Air Brake Company, of Pittsburgh, U.S.A. (*Application date*: *December* 16, 1943.)

An electrical wheel slip indicator, comprising a magneto generator of which the output is proportional to its speed of rotation, is driven by the axle and charges a condenser, so connected to relays that if the rate of decrease of voltage, resulting from retardation, exceeds a predetermined limiting amount, thereby indicating wheel slip, a relay is operated and advances a selector switch one step to increase the resistance in the circuit of an electromagnetically-operated control valve. This vents to atmosphere the applied pressure in the brake cylinder, thereby releasing the brakes, and then allows it to build up again to a pressure approximately 10 per cent. below that previously applied. If the wheels still slip, under this reduced braking effort, the process is repeated, the switch progressively connecting additional resistance into the control circuit and reducing the braking pressure on each reapplication until no slip occurs.

Power for the electrical equipment is supplied by the local battery, and is switched on automatically by a pressure-operated switch when the brakes are first applied. The equipment therefore remains operative, and the brakes remain applied after the train has been brought to rest and until all brakes are released by the driver's main control valve.

No. 576,132. Retarding Apparatus

A. V. Tomlinson, of 65, Victoria Street, London, S.W.1. Communication from Union Switch & Signal Company, of Swissvale, Pennsylvania, U.S.A. (*Application date*: *December* 30, 1942).

An automatic retarding apparatus, for use in connection with a hump or similar arrangement, brakes vehicles to any desired speed pre-set by means of a control lever. A length of track is divided into six sections of approximately 3 ft. length, and, when the front wheels of a wagon enter each section, a chain of electrical counting relays counts the number of alternations of an alternating current supply of constant frequency until the wheels leave the section, thereby providing a measure of the time taken for the wagon to pass through each section.

The braking device itself comprises a pair of bars parallel to and slightly above each rail of the track, each bar being pivoted so that the two bars of each pair can clamp a wheel between them. The clamping action is performed pneumatically.

When the wagon enters the first measured section, the bars are applied at full pressure, and as long as the speed is greater than desired, pressure depending on the excess speed is maintained to retard the wagon. The correct speed is indicated when the last counting relay to be operated, as the wagon passes out of a section, corresponds to the one selected by the control lever, and a circuit is then completed to relieve the pressure and release the retarding bars. The wagon thus continues at this speed. Five positions are provided for the control lever, corresponding to five speeds, all of which may be pre-set.

Complete Specification Accepted

575,313. Clayton-Dewandre Co. Ltd., and Edge, H. Combined clutch and brake control.

* These abridgments of recently published specifications are specially compiled for *The Railway Gazette*, by permission of the Controller of His Majesty's Stationery Office. Full specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each

Notes and News

Wharf Foreman Required.—A wharf foreman, not over 35 years of age, is required by the Nigerian Government Railway for one tour of 18 to 24 months with possible permanency. See Official Notices on page 251.

G.W.R. Wagon Repair Depot Re-opens.—The G.W.R. carriage and wagon shed at Cherry Orchard, Llanishen, near Cardiff, used as a Royal Naval stores during the war, has just been re-opened for light repairs to railway wagons. It is expected that ultimately up to 100 wagons will be dealt with weekly.

Vacancies for Drawing Office Staff with Coras Iompair Eireann.—Coras Iompair Eireann has vacancies in its drawing office for two fully qualified mechanical draughtsmen, two fully qualified carriage & wagon draughtsmen, and one lady tracer, conversant with mechanical engineering practice. See Official Notices on page 251.

Argentine Railways Purchasing Agency.—A private company with a capital of £500 in £1 shares has been registered with the title of the Argentine Railways Purchasing Agency. Its objects are to carry on the business of purchasing, shipping and general agent in the United Kingdom and elsewhere for any Government, company, department, board, or person owning or operating railways or other undertakings in the Argentine Republic, or any other part of the world. The two subscribers, each with 250 shares, are Sir Montague Eddy and Mr. B. H. Binder. Sir Montague Eddy has stated that the agency has been formed to carry on commitments made by the British companies in Argentina on behalf of the Argentine Government. Such an organisation is essential for fulfilment of contracts for steel, iron, rolling stock and all materials needed for the railways, and will facilitate smooth functioning without interruption. Previously the companies had their individual purchasing arrangements. It is understood that the new company will begin operations as soon as the railways sale agreement is ratified.

Pirelli-General Cable Works Limited.—The report for the year ended March 31 last recommends a dividend of 8 per cent., as in the previous year, plus a bonus of 12 per cent., compared with 4 per cent. last year. There was an increase in net profit after taxation from £91,052 to £339,688.

Traffic Commissioners' Title Changed.—The Minister of Transport has drawn attention to the provisions of Section 117 of the Transport Act, 1947, which changes the title of the Traffic Commissioners (Road Traffic Act, 1930) to "The Licensing Authority for Public Service Vehicles"; and the title of the Licensing Authority (Road & Rail Traffic Act, 1933) to "The Licensing Authority for Goods Vehicles."

North Central Wagon & Finance Limited.—Net revenue and sundry income for the year ended June 30 totalled £157,567, as compared with £116,474. The net profit, after taxation, rose from £35,552 to £52,265. A dividend of 6d. per 4s. ordinary share is recommended, and £10,000 as in the preceding year is placed to reserve. The carry-forward of £32,987 compares with £27,738 in the preceding year.

B.E.T. Omnibus Services Limited.—The report of the company for the year ended June 30 last shows a profit of £270,213, as compared with £192,125 in the preceding year. A balance of £61,844 from 1945-46 gives a total of £332,057, from which £70,000 has been transferred to general reserve. From the balance of £262,057, the directors recommend a final dividend of 10 per cent. on the cumulative preference shares, making 15 per cent. for the year, and 9 per cent., free of income tax, on the ordinary shares, making 12½ per cent. for year. A balance of £76,557 will be carried forward. A statement by the Chairman, Mr. J. S. Wills, which is circulated with the report and accounts, observes that in the view of the board there is a total absence of need for any Government-directed scheme for the operation of provincial bus services.

Argentine Government Invites Tenders for Supply of Wagons.—The Argentine Government is inviting tenders for the supply of 2,500 wagons of various types

Aberdeen Joint Station Signalling

Photo] *[O. S. Nock*

L.N.E.R. train at Aberdeen, showing new signals with multi-lamp route indicators and the new South Signal Box, which contains a 150-lever L.M.S.R. standard type locking frame

British and Irish Railway Stocks and Shares

Stocks	Highest 1946	Lowest 1946	Prices Aug. 26, 1947	Prices Rise Fall
G.W.R.				
Cons. Ord.	61½	54½	54	– ½
5% Con. Pref. ...	126½	107	115½	–
5% Red. Pref. (1950)	106½	102½	98½	–
5% Rt. Charge ...	140½	122½	128½	–
5% Cons. Guar. ...	137½	118½	126½	–
4% Deb.	129½	106	118½	–
4½% Deb.	129½	107	119	–
4½% Deb.	130½	114	120½	–
5% Deb.	142½	125	130½	–
2½% Deb.	95½	81½	88½	–
L.M.S.R.				
Ord.	30½	26½	27½	–
4% Pref. (1923) ...	64	52½	57½	– ½
4% Pref.	86	75½	77½	– 1½
5% Red. Pref. (1955)	105½	97	97½	–
4% Guar.	108½	100	99	– ½
4% Deb.	120	103	109½	– ½
5% Red. Deb. (1952)	108½	105½	101½	–
L.N.E.R.				
5% Pref. Ord. ...	7	5	6⅜	– ⅛
Def. Ord.	3½	2½	3¼	–
4% First Pref. ...	59½	50½	53½	– ½
4% Second Pref. ...	29½	25¾	27	– ½
5% Red. Pref. (1955)	104	97	94½	–
4% First Guar. ...	107	98	97½	–
4% Second Guar. ...	101	90	92½	–
3% Deb.	104	87½	95	–
4% Deb.	119½	102½	109	– ½
4½% Sinking Fund Red. Deb.	107½	101½	99½	–
SOUTHERN				
Pref. Ord.	79½	70	71½	–
Def. Ord.	24	19½	22½	– ½
5% Pref.	125½	107	114½	–
5% Red. Pref. (1964)	115½	106½	106½	–
5% Guar. Pref. ...	137½	119	126½	–
5% Red. Guar. Pref. (1957)	115½	107½	105½	–
4% Deb.	129½	105½	118½	–
5% Deb.	139½	125½	128½	–
4% Red. Deb. (1962-67)	113½	104½	104½	–
4% Red. Deb. (1970-80)	115½	104½	105½	–
FORTH BRIDGE				
4% Deb.	109	103	99½	–
4% Guar.	105	102	95½	–
L.P.T.B.				
4½ "A"	133½	120½	122½	–
5% "A"	142½	130½	131½	–
3% Guar. (1967-72)...	108	98½	97	–
5% "B"	128½	117½	117½	–
"C"	64½	56½	60½	–
MERSEY				
Ord.	34	30	32½	–
3% Perp. Pref. ...	76	69	69½	–
4% Perp. Deb. ...	117½	103	108	–
3% Perp. Deb. ...	98	81	90½	–
IRELAND*				
BELFAST & C.D.				
Ord.	8½	6	7½	–
G. NORTHERN				
Ord.	41⅜	30½	26½	+ ½
Pref.	63½	52	42	+ 2
Guar....	97½	78½	72½	– 10
Deb.	107	97½	96	– 1½
IRISH TRANSPORT				
Common	19/2½	16/9	14/–	– 3d
3% Deb.	107	100	101	+ ½

* Latest available quotation

OFFICIAL NOTICES

Crown Agents for the Colonies

APPLICATIONS from qualified candidates are invited for the following post:—

WHARF FOREMAN required by the Nigerian Government Railway for one tour of 18 to 24 months with possible permanency. Salary and expatriation pay £600 rising to £800 a year; commencing salary according to age and war service. Outfit allowance £60. Free passage. Candidates, not over 35, must have thorough practical knowledge of Port Warehouse and Wharf working, also Port Yard working at a large depot. They must be able to supervise Wharf and Yard staff and be experienced in loading and handling of out-of-gauge loads. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/16796 on both letter and envelope.

BRITISH WORK ON PERSIAN RAILWAYS. The achievements and difficulties of the R.Es. during the 15 months in which they laid the foundation for effective aid to Russia. Reprinted from *The Railway Gazette*, February 2 and 16, 1945 *Price* 1*s*. *Post free* 1*s*. 2*d*.

STEEL STRUCTURES purchased, dismantled and removed. Industrial steel structures re-built, re-roofed and renovated. Steel factory buildings dismantled, re-erected or adapted on other sites.—BELLMAN HANGARS LIMITED, Terminal House, Grosvenor Gardens, London, S.W.1. Sloane 5259.

WANTED: Secondhand Standard Gauge Saddle Tank Locomotive; 0-4-0 about 5 ft. 6 in. Wheelbase; Wheel dia. approx. 3 ft. 6 in.; Cylinders 14 in. x. 22 in. stroke approx:; Boiler pressure 160 lb. per sq. inch.—Stanton Ironworks Co. Ltd., Nr. Nottingham.

Coras Iompair Eireann

Vacancies for Drawing Office Staff

Applications are invited for the following positions:—

Two fully qualified Mechanical Draughtsmen with experience in Locomotive Traction. Experience in Diesel Electric Traction would be an advantage.

Two fully qualified Carriage and Wagon Draughtsmen with experience of up-to-date Practice, including Metal Construction.

One Lady Tracer conversant with Mechanical Engineering Practice.

Applications stating qualifications, age, experience and present employment, should be addressed to Personnel Officer, Transport House, Bachelor's Walk, Dublin.

CORAS IOMPAIR EIREANN

PLASTICS IN RAILWAY ENGINEERING. By T. Lovatt Williams and D. Warburton Brown. 1*s*. *By post* 1*s*. 2*d*.

(metre-gauge) and accessories; the final date will be November 14, 1947 (3 p.m.). Drawings and specifications are available for inspection at the Office of the Economic Counsellor to the Argentine Embassy, 9, Wilton Crescent, London, S.W.1.

Derailment in Portugal.—A crowded main-line mixed train was derailed near Vila Franca de Xira on August 16 as a result of the breaking of a wagon axle. It is reported that 17 persons were killed, and nearly 100 injured, many of them seriously.

London Transport Service to Olympia.—London Transport is running a special service of District Line trains between Earls Court and Kensington (Olympia) for visitors to the Engineering & Marine Exhibition, which opened at Olympia on Thursday. Trains run every ten minutes, the first leaving Earls Court at 10.8 a.m., and the last departing from Kensington (Olympia) at 10.8 p.m. This special service will be in operation for the duration of the exhibition (until September 13).

Rhodesia Railways Limited.—The accounts for the year to September 30, 1946, show a total revenue of £6,296,538, as against £6,192,325 in 1944-45. Expenditure rose from £3,495,207 to £4,114,793, and the depreciation of £546,893 compared with £548,074 in the preceding financial year. After other charges, a profit of £1,665,802 was shown, comparing with £2,116,400. Debenture interest took £854,706, the sinking fund for redemption of debentures took £245,996, and after providing £992,917 for taxation there remained a balance of £125,000, comparing with £141,298 in the previous year. No transfer is made to rates stabilisation account, which received £16,298 in the previous year. The dividend on 500,000 shares at £1 (all held by the Government of Southern Rhodesia) is maintained at 25 per cent.

Scammell Lorries Limited.—At the annual general meeting of Scammell Lorries Limited, the Chairman, Mr. E. R. Cartwright, described recent developments and plans for expansion of the company's activities. Important progress had been made in the design of heavy rigid and articulated vehicles. The mechanical horse was in universal demand, and post-war requirements for multiple trailers had made the company's conversion gear and quickly detachable coupling an increasingly important item in their business. Although the immediate outlook had its darker side, the long term view was bright, since the demand for the types of vehicle in which the company specialised was great. They had put in hand the first part of an expansion programme to provide additional engineering shops and manufacturing facilities. Some of the new buildings should be in use later this year, and plans for the second part of the programme were already under consideration by the directors.

Electrification at Newhaven, Southern Railway.—In preparation for the first stage in the Southern Railway scheme for the electrical working of the Continental boat trains between London and Newhaven, the platform roads Nos. 1 and 2 at Newhaven Harbour Boat Station were electrified as from July 17.

Fire in German Train.—Fire broke out in a train at Velten, near Berlin, on August 23, when a cigarette end set fire to petrol leaking from a can on a carriage luggage rack. The fire ignited a package containing cinematograph films. The train was stopped by a ticket collector, but 24 passengers were killed and 35 injured in attempting to get out through the only unobstructed door at one end of the affected carriage.

Ribble Motor Services Limited.—A total revenue of £2,807,426, being an increase of £650,517 above the previous 12 months, was recorded in the year ended March 31. In commenting at the annual general meeting on the company's activities, the Chairman, Mr. J. S. Wills, said that passengers still were not obtaining travel in the superior types of vehicles to which they were accustomed before the war. The production bottleneck in the building of vehicle bodies had proved more serious than even the most pessimistic in the industry had believed, and it would be some time before accelerated deliveries could be expected. Discussing the area schemes of transport organisation provided for in the Transport Bill, Mr. Wills declared that such schemes, under a public monopoly, would lead to the elimination of some services, and the reduction in frequency of others, together with the raising of road fares to the level of railway fares.

General Electric Co. Ltd.—At the annual general meeting, Sir Harry Railing, Chairman & Joint Managing Director, said that they were doing their utmost to answer the call for increased production in all fields. They had increased and intended to increase still further their output of capital goods in connection with generating and transmission plant and traction work. They had greatly strengthened, also, their trading organisations in all parts of the world, and he was glad to be able to report that, despite all the difficulties under which they had to function, they could show a satisfactory year. Looking ahead, they had to rely, among other things, on the extent to which the Government would keep the country to a sane wages policy, enabling industry to compete in the world markets, and to a policy which would provide sufficient incentive for industry to enter cheerfully and confidently into new and heavy commitments. It was unfair both to employers and stockholders and against the broad national interest to curtail unduly the returns and rewards from industrial undertakings in view of the great risks which had to be run and in view of the present impossibility of balancing failures in one field against greater reliability in another.

Railway Clearing House Change of Address.—As from July 21 the address of the Railway Clearing House has been: 203, Eversholt Street, London, N.W.1. Telephone No., Euston 5404; Telegrams, Clearness, Norwest, London.

San Paulo (Brazilian) Railway Co. Ltd.—The annual meeting of the San Paulo (Brazilian) Railway Co. Ltd. was held in London on August 26, but there was still no further news of when, or how, the compensation for the acquisition of the railway by the Brazilian Government is to be paid. Mr. G. M. Booth, the Chairman, said that the board was greatly disappointed to have reached August, 1947, without any settlement arising in Brazil. He thought the explanation was, in part, that the country now had an entirely new constitution which had not yet settled down. He could neither confirm nor deny reports that the question of the purchase was to be referred back to a Congressional Committee. The expropriation document was signed by the former President, and shortly after was implemented in a legal manner. They had no reason to believe that the purchase agreement was not legal under the new constitution. They did not know whether the decision could be reversed, were unfamiliar with the workings of the new Congress, and did not know what Congress would do about the purchase agreement. The board's proposals for dealing with a capital sum of £6,638,000, should that be received *in lieu* of bonds, were reported in our August 22 issue.

Forthcoming Meetings

September 3 (*Wed.*)—The Royal Engineers, Transportation Training Centre, Longmoor Camp, Liss, Hants. 12.30 p.m. to 6 p.m. "At Home."

Railway Stock Market

Earlier in the week business in stock markets showed further contraction pending fuller details of the Government's crisis plans, industrial shares being neglected, with small declines predominating. Some of the leading industrials rallied moderately, partly because yields are attractive, and partly because the view is held in some quarters that they offer a hedge against the danger of increased inflation. Now sterling has lost its dollar convertibility, slowing down of international trade seems likely for the time being, and with the big cuts in dollar imports, the supply of goods must contract; while, on the other hand, there will be little reduction in the spending power of the public. In the circumstances, rising prices and more inflation seem inevitable, and this may necessitate another Budget in the autumn, designed to limit the spending power of the public.

The increase in the price of coal is an additional factor which in time is bound to lead to increases in prices of a wide range of goods. In view of the great uncertainty prevailing until the repercussions of the Government's proposals can be assessed more fully, it is hardly surprising that industrial shares have remained out of favour. Nevertheless, in many directions it would seem yields are attractive at current levels, and that there will be reasonable prospects of dividends being maintained, granted the winter does not bring another fuel crisis.

Because of the prevailing uncertainty there has been a tendency for British Funds to return to favour, and values in this section have recorded another good rally led by 2½ per cent. Consols and 2½ per cent. Treasury Bonds. Despite further news of trade union requests for early nationalisation, iron and steel shares steadied. It is realised that fair compensation in the event of nationalisation would justify higher prices than those now current for most iron and steel shares, and that, if nationalisation were postponed, there would seem reasonable prospects of dividends being maintained, on which basis current yields would be particularly attractive.

Home rails have been unresponsive to the gilt-edged rally and, where changed, moved fractionally lower, there being only moderate demand, despite the scope for capital appreciation indicated by the extent that current prices are at a discount to take-over prices. Indeed, granted that the economic crisis does not become so serious that nationalisation compensation is postponed by the Government, home railway stocks are one of the few groups of securities combining investment merits with the assurance of capital appreciation. Among Great Western stocks, for example, the 5 per cent. consolidated preference is now 114½, or 10 points below the take-over price of 125 3/16, while the 4 per cent. debenture at 118 are 10 points discount to the take-over price (128 3/16). In fact, apart from home rails, it would seem there are no other securities which offer a safe refuge for money during the economic crisis and at the same time have good scope for capital appreciation.

Foreign railway stocks attracted considerable attention, notably Argentine rails, which have moved erratically, although it appears that not a great deal of stock has changed hands. Following the economic crisis which has forced sterling to be deprived of its convertibility into dollars, there have been rumours of a last-minute hitch in connection with the Argentine railway deal. The scheme has now passed the British High Court and only awaits final ratification by Argentina. Fears of a hitch have been based on the fact that in addition to the blocked sterling balances, Argentina will have to find some £35,000,000 for the railway deal, which will have to come out of her current sterling earnings.

Later, however, sentiment was assisted by reports that President Peron had stated that the railway agreement would be ratified. Best prices were not held and there was a reaction in the absence of confirmation of this report. Well-informed opinion is confident that the scheme will be ratified, but there are fears that, following the non-convertibility of sterling, the Argentine Government may decide to seek some special arrangement in regard to the £35,000,000 balance of purchase money which will have to be provided out of current sterling earnings. Developments of this kind may prove unfounded, and in any case they would be no reason for selling Argentine rails, because in any case the take-over prices still hold good. In any event, the debenture holders—the first class to be paid—are not expected to receive their share-out money until the end of October. For the time being, however, it must be expected that Argentine rails will continue to move closely with the nature of the news and rumours from Buenos Aires. Elsewhere, San Paulo Railway ordinary stock was steady pending the meeting, which was awaited for any further compensation news.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffic for week: Total this year	Traffic for week: Inc. or dec. compared with 1945/46	No. of Week	Aggregate traffics to date: Totals 1946/7	Aggregate traffics to date: Totals 1945/6	Aggregate traffics to date: Increase or decrease	Shares or Stock	Prices: Highest 1946	Prices: Lowest 1946	Prices: Aug. 26, 1947
				£	£		£	£	£				
South & Central America	Antofagasta	834	17.8.47	43,800	+ 12,760	33	1,339,010	1,057,830	+ 281,180	Ord. Stk.	11	10¼	11
	Arg. N.E.	753	16.8.47	ps.327,300	+ps.47,000	7	ps.2,110,900	ps.2,199,500	− ps. 88,600	,,	17	5	10
	Bolivar	174	July, 1947	$98,317	− $9,349	30	$773,180	$760,024	+ $13,156	6 p.c. Deb.	6½	5½	16½
	Brazil	—	—	—	—	—	—	—	—	Bonds	30	26	32½
	B.A. Pacific	2,771	16.8.47	ps.2,625,000	+ps.575,000	7	ps.16,550,000	ps.14,988,000	+ ps.1,562,000	Ord. Stk.	8½	5½	9½
	B.A.G.S.	5,080	16.8.47	ps.3,328,000	+ps.288,000	7	ps.23,049,000	ps.23,036,000	+ ps.13,000	Ord. Stk.	16	10½	16
	B.A. Western	1,924	16.8.47	ps.1,348,000	+ps.147,000	7	ps.9,037,000	ps.8,062,000	+ ps.975,000	,,	19	9½	20
	Cent. Argentine	3,700	16.8.47	ps.3,322,220	+ps.310,870	7	ps.21,961,355	ps.21,548,885	+ ps.412,470	,,	10¼	7½	17
	Do.	—	—	—	—	—	—	—	—	Dfd.	6	4½	11½
	Cent. Uruguay	970	16.8.47	35,430	+ 2,428	7	225,748	245,426	− 19,678	Ord. Stk.	8½	3½	17
	Costa Rica	262	Apr., 1947	33,865	− 83	44	286,765	286,820	− 55	Stk.	15	12	10
	Dorada	70	July, 1947	33,000	− 2,100	31	212,800	221,375	− 8,575	1 Mt Deb.	102½	99½	108
	Entre Rios	808	16.8.47	ps.461,500	+ps.21,200	7	ps.2,915,800	ps.2,945,500	− ps. 29,700	Ord. Stk.	9	5½	9½
	G.W. of Brazil	1,030	16.8.47	27,500	+ 4,500	33	1,041,900	903,500	+ 138,400	Ord. Stk.	26/6	20/−	3½
	Inter. Ctl. Amer.	794	June, 1947	$1,002,064	+ $199,162	26	$6,902,843	$5,657,516	+ $1,245,327	—	—	—	—
	La Guaira	22¾	July, 1947	$100,778	− $27,921	30	$785,160	$822,241	− $37,081	5 p.c. Deb.	70	58	83xxc
	Leopoldina	1,918	16.8.47	70,914	+ 5,785	33	2,155,446	1,871,665	+ 283,781	Ord. Stk.	5	3¼	13
	Mexican	483	31.5.47	ps.1,464,000	+ps.459,100	22	ps.7,706,200	ps.13,441,600	+ ps.5,220,000	Ord. Stk.	1¾	¾	1
	Midland Uruguay	319	July, 1947	15,947	− 3,037	4	15,947	18,984	− 3,037	—	—	—	—
	Nitrate	382	15.8.47	10,081	+ 2,750	32	145,136	135,362	+ 9,774	Ord. Sh.	83/9	71/3	72/6
	N.W. of Uruguay	113	July, 1947	3,987	− 716	4	3,987	4,703	− 716	—	—	—	—
	Paraguay Cent.	274	25.7.47	G75,097	+ G$15,672	4	G202,849	G228,044	− G25,195	Pr.Li.Stk.	78½	60	44½
	Peru Corp.	1,059	July, 1947	162,690	+ 11,788	4	162,690	150,902	+ 11,788	Pref.	16½	8¾	9
	Salvador	100	Apr., 1947	c145,000	+ c6,300	44	c1,483,000	c1,393,700	+ c89,300	—	—	—	—
	San Paulo	153½	—	—	—	—	—	—	—	Ord. Stk.	119½	52½	147½
	Taltal	156	July, 1947	5,585	+ 1,790	4	5,585	3,795	+ 1,790	Ord. Sh.	22/6	15/3	17/−
	United of Havana	1,301	16.8.47	60,774	+ 7,894	7	424,756	379,740	+ 45,016	Ord. Stk.	2	1¾	2
	Uruguay Northern	73	July, 1947	1,072	− 58	4	1,072	1,130	− 58	—	—	—	—
Canada	Canadian National	23,535	June, 1947	9,348,000	+1,447,250	26	53,060,250	46,539,250	+ 6,521,000	—	—	—	—
	Canadian Pacific	17,037	14.8.47	1,516,750	+ 6,650	32	47,663,500	43,696,000	+ 3,967,500	Ord. Stk.	25¼	16¼	16
Various	Barsi Light†	202	July, 1947	34,095	− 2,220	18	114,300	109,700	+ 4,600	Ord. Stk.	123½	111	110½
	Beira	204	June, 1947	99,433	+ 20,525	37	828,897	676,166	+ 152,731	—	—	—	—
	Egyptian Delta	607	20.8.47	16,791	− 887	15	179,814	181,642	− 1,728	Prf. Sh.	9¼	5	6½
	Manila	—	—	—	—	—	—	—	—	B. Deb.	75	60	71½
	Mid. of W. Australia	277	June, 1947	16,351	− 329	52	202,351	208,970	− 6,619	Inc. Deb.	85	70	75
	Nigeria	1,900	May, 1947	376,824	− 32,267	9	731,208	761,991	− 30,783	—	—	—	—
	Rhodesia	2,445	June, 1947	569,518	+ 35,926	37	4,978,485	4,600,382	+ 378,103	—	—	—	—
	South African	13,323	26.7.47	1,208,660	+ 118,796	17	20,673,576	18,315,380	+ 2,358,196	—	—	—	—
	Victoria	4,774	May, 1947	989,352	− 361,928	48	—	—	—	—	—	—	—

† Receipts are calculated @ 1s. 6d. to the rupee